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M E M O R A N D U M

TO: John Mitnik, Chief, Engineering and Construction Bureau
Paul Linton, Administrator, Water Control Operations Section

FROM: SFWMD Staff Environmental Advisory Team

DATE: March 15, 2016

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Kissimmee

On Sunday, stage in East Lake Toho was 0.7 feet below schedule and Toho was 0.6 feet below schedule; Kissimmee-Cypress-Hatchineha (KCH) was 0.2 feet below schedule. Over the past week, discharge at S65 averaged 505 cfs and at S65A 408 cfs; discharge at S65E averaged 1,360 cfs. Tuesday morning discharges: S65 ~405 cfs; S65A ~280 cfs; S65C ~500 cfs; S65E ~715 cfs. Dissolved oxygen in the Kissimmee River averaged 5.98 mg/L over the past week and 6.36 mg/L on Sunday. Kissimmee River mean floodplain depth is currently 0.52 feet.

Lake Okeechobee

The recession in Lake stage continued this past week, dropping the Lake an additional 0.24 feet. The Lake is at 15.41 feet NGVD and is in the Low Flow Sub-band. Ecological conditions for wading birds, snail kites, and species in the nearshore region remain poor but may improve if the recession continues.

Estuaries

Total inflow to the estuaries declined over the past week due to reduced discharges and little rainfall. In the St. Lucie Estuary, total freshwater inflow averaged 2,203 cfs with 1,597 cfs Lake Okeechobee releases. Salinities remained in the poor range for adult oysters in the mid-estuary but had increased slightly from the previous week. In the Caloosahatchee Estuary, total freshwater inflow averaged 4,656 cfs with 4,020 cfs Lake Okeechobee releases. Salinities were in the poor range at Cape Coral and in the good range at Shell Point and Sanibel for adult oysters.

Stormwater Treatment Areas

Over the past week, the STAs/FEBs received approximately 8,600 acre-feet of Lake regulatory releases. The total amount of Lake regulatory releases sent to the STAs/FEBs in WY2016 (since May 1) is approximately 183,700 acre-feet. All STA cells are at or above target depths and restrictions are in place for structure repairs and Snail Kite nesting in STA-1E, vegetation rehabilitation in STA-1W, a Restoration Strategies Science Plan Study in STA-2 and vegetation rehabilitation in STA-3/4. This week, it is recommended that Lake releases be sent to the A-1 FEB, but none to the STAs.

Everglades

Rainfall was low last week, and with water management, stage changes ranged from -0.36 feet to 0.04 feet. Water levels are about a half foot to four feet deep in most of the wetlands. Most of WCA-2A and -3A remain closed because of high water and its effects on terrestrial wildlife. WCA-3A water levels have exceeded 2.5 feet, the depth monitored for tree island inundation and duration, from seven to 16 weeks. Deep water is affecting terrestrial wildlife, preventing wading bird foraging and nesting, and may be affecting vegetation on tree islands. The 30-day moving average salinity at the Florida Bay

MFL site is 0.6 psu and the cumulative inflow from the five creeks into Florida Bay has risen to 254,660 acre-feet. Florida Bay salinities are close to average for this time of year.

Weather Conditions and Forecast

Mainly dry and quite warm through Thursday before showers/storms return by the weekend. High pressure will dominate our skies for the next few days with only isolated showers possible southeast this afternoon. Friday will be a transition day into a likely wet weekend as a strong cold front sweeps through the District. Initial guesstimate is that heavier rains will focus north of the Lake Friday night before shifting south of the Lake on Saturday.

KISSIMMEE BASIN

Kissimmee Basin Rainfall

The Upper Kissimmee Basin received 0.00 inches of rainfall in the past week and the Lower Basin received 0.01 inches (SFWMD Daily Rainfall Report 3/14/2016).

Upper Kissimmee Basin

Stages and departures in the Kissimmee Chain of Lakes (KCOL) are shown in Table1.

Table 1. Departures from KCOL flood regulation (F) or temporary schedules (T, A, or S) (feet NGVD). Discharge and stage data are provisional real-time data from SFWMD OASyS DualTrend; reported values are averages through midnight of the Sunday prior to the report date unless otherwise specified.

Report Date: 3/15/2016							Sunday Departure (feet)						
Water Body	Structure/Site	Discharge (cfs), week's average**	Stage Monitoring Site***	Lake Stage (feet)	Schedule*	Regulation (R) or Target (S or T) Stage (feet)	3/13/16	3/6/16	2/28/16	2/21/16	2/14/16	2/7/16	1/31/16
Lakes Hart and Mary Jane	S62	12	LKMJ	60.6	R	61.0	-0.4	-0.4	-0.6	-0.6	-0.4	-0.5	-0.5
Lakes Myrtle, Preston, and Joel	S57	19	S57	60.8	R	60.9	-0.1	-0.1	-0.1	-0.1	-0.1	0.0	-0.1
Alligator Chain	S60	0	ALLI	63.7	R	64.0	-0.3	-0.3	-0.3	-0.2	-0.5	-0.5	-0.5
Lake Gentry	S63	2	LKGT	61.3	R	61.5	-0.2	-0.3	-0.2	-0.2	-0.3	-0.2	-0.2
East Lake Toho	S59	38	TOHOE	57.3	R	58.0	-0.7	-0.4	-0.6	-0.5	-0.6	-0.5	-0.4
Lake Toho	S61	209	TOHOW	54.4	R	55.0	-0.6	-0.5	-0.6	-0.5	-0.6	-0.6	-0.4
Lakes Kissimmee, Cypress, and Hatchineha	S65	505	LKISSP, KUB011, LKISSB	50.8	R	51.0	-0.2	-0.1	-0.1	0.0	-0.2	-0.5	-0.7

* T = temporary schedule, R = USACE flood control schedule, S = temporary snail kite schedule, A = projected ascension line, N/A= not applicable or data not available.

** Seven-day average of weighted daily means through Sunday midnight.

*** Names of in-lake monitoring sites and structures used to determine lake stage; if more than one site is listed, an average is reported.

DATA ARE PROVISIONAL

Lower Kissimmee Basin

Discharges and stages at Lower Basin structures are shown in Table 2. SFWDAT depth maps for the Phase I restoration area are shown in Figure 11. Kissimmee River floodplain stages at selected stations are shown in Figure 12.

Table 2. Mean weekly discharge at S-65x structures, and mean weekly Phase I area river channel dissolved oxygen and floodplain mean water depth. Discharge and stage data are provisional real-time data from SFWMD OASyS DualTrend; reported values are averages through midnight of the Sunday prior to the report date unless otherwise specified.

Report Date: 3/15/2016

Metric	Location	Sunday's 1-day average	Weekly Average**									
			3/13/16	3/6/16	2/28/16	2/21/16	2/14/16	2/7/16	1/31/16	1/24/16	1/17/16	1/10/16
Discharge (cfs)	S-65	432	505	1313	2770	2257	1997	3248	802	477	130	347
Discharge (cfs)	S-65A	306	408	1214	2817	2261	2223	3772	1355	1115	463	286
Discharge (cfs)	S-65C	588	1237	2629	2850	2515	3805	2987	2261	2017	877	536
Headwater stage (feet NGVD)		34.1	34.2	34.9	35.2	34.5	34.8	34.5	33.7	33.7	33.5	33.4
Discharge (cfs)	S-65D****	705	1375	2713	3112	2810	4355	3811	3336	2716	1318	726
Discharge (cfs)	S-65E	756	1360	2696	3101	2880	4513	3975	3703	2779	1369	582
DO concentration (mg/L)***	Phase I river channel	6.36	5.98	5.36	5.37	6.82	7.39	5.85	7.36	6.56	7.12	7.08
Mean depth (feet)*	Phase I floodplain	0.52	N/A	1.12	1.81	1.44	1.64	2.19	1.10	0.92	0.79	0.54

* 1-day spatial average from South Florida Water Depth Assessment Tool (SFWDAT).

** Seven-day average of weighted daily means through Sunday midnight.

*** DO is the average for PC62 and PC33 starting June 2. PC33 omitted for week of Aug16. DO for week of Sept 15-22 is for PC33 only.

**** S-65D discharge combines discharge at S-65D, S-65DX1, and S-65DX2

***** 1-day spatial average from field measurements in Pools A and BC

N/A Not applicable or data not available.

DATA ARE PROVISIONAL

Water Management Recommendations

Kissimmee Basin Adaptive Recommendations and Operational Actions

Date	Recommendation	Purpose	Outcome	Source
3/15/2016	No new recommendations.			
3/8/2016	No new recommendations.			
3/1/2016	No new recommendations.			
2/23/2016	No new recommendations.			
2/16/2016	No new recommendations.			
2/9/2016	No new recommendations.			
2/1/2016	Begin F&W recessions in East Toho, Toho, and KCH per the requested recession lines shown in the 2015-16 Dry Season Standing Recommendation (SR). Use Table 2 for guidance on rates of change in discharge to control departures from the line in KCH, and the reversal guidelines shown in the SR for Toho and East.	Initiate and manage lake stage recessions in East Toho, Toho, and KCH for the benefit of fish and wildlife, while avoiding harm to the Kissimmee River	TBD	KB Tech Team
1/20/2016	Continue to adjust discharge at S65 to follow the 2015-16 Dry Season SR guidelines for rampdown at S65A. Balance discharge at the two structures to maintain at least minimum discharge to the river. As stage rises above 51 ft in KCH, temporarily bypass the Fig 1 discharge plan in the SR and manage discharge to let KCH stage rise to 51.5 ft (the Feb 1 recession starting stage) if conditions allow while following rampdown guidelines. If KCH stage rises further than 51.5 ft, we will reevaluate. As changes in discharge become necessary, continue to follow the Table 1 guidelines in the SR. Switch to Table 2 rampup/rampdown guidelines on Feb 1 or when the recession line is intercepted for management of the recession in KCH.	If conditions allow, let stage increase to 51.5 ft to intersect the Feb 1 starting stage for KCH F&W recession line.	Implemented	KB Tech Team
12/10/2015	Temporarily raise from 50.5 ft to 51 ft the threshold stage for increasing discharge at S65/S65A to 1400 cfs. This is a temporary modification of the current draft 2015-16 dry season Standing Recommendation (SR). Discontinue last week's temporary change in the rate of discharge increase and return to the original per-day rates shown in Table 1 of the draft SR - i.e., increase discharge to 1400 cfs at a rate of 150 cfs/day rather than 150 cfs/2 days. If KCH stage should start to decline while ramping up but before reaching 1400 cfs, begin to ramp back down using the rates in Table 1.	Slow the effect of discharge on KCH stage, balance KCH stage and KRRP discharge objectives.	Implemented	KB Tech Team
12/9/2015	Maintain ~300 cfs at S65/S65A until average stage in KCH rises to 51 ft. This is a temporary modification of the current draft dry season SR raising the stage threshold for discharge rampup from 50.5 ft to 51 ft. Once stage reaches 51 ft, begin increasing discharge at a rate of 150 cfs/day per Table 1 in the draft 2015-16 Dry Season SR. Discontinue the temporary guidance provided below (12/2/2015) and return to the original guidelines for rate of discharge rampup per Table 1 (150 cfs/day rather than 150 cfs/2 days).	Slow the effect of discharge on KCH stage, balance KCH stage and KRRP discharge objectives.	Implemented	KB Tech Team
12/2/2015	Temporary modification of draft Dry Season SR for rainfall forecast the week of Nov. 30. If stage in KCH increases to 50.5 ft, begin increasing S65 discharge to 1400 cfs at a rate of up to 150 cfs per 2 days rather than every day – this is half the discharge increase rate in Table 1 of the draft 2015-2016 Dry Season SR.	The slower discharge increase rate is a temporary change that is intended to allow time to assess whether or not we have entered a wetter period that would allow 1400 cfs to be sustained.	TBD	KB Ops

KCOL Hydrographs (through Sunday midnight)

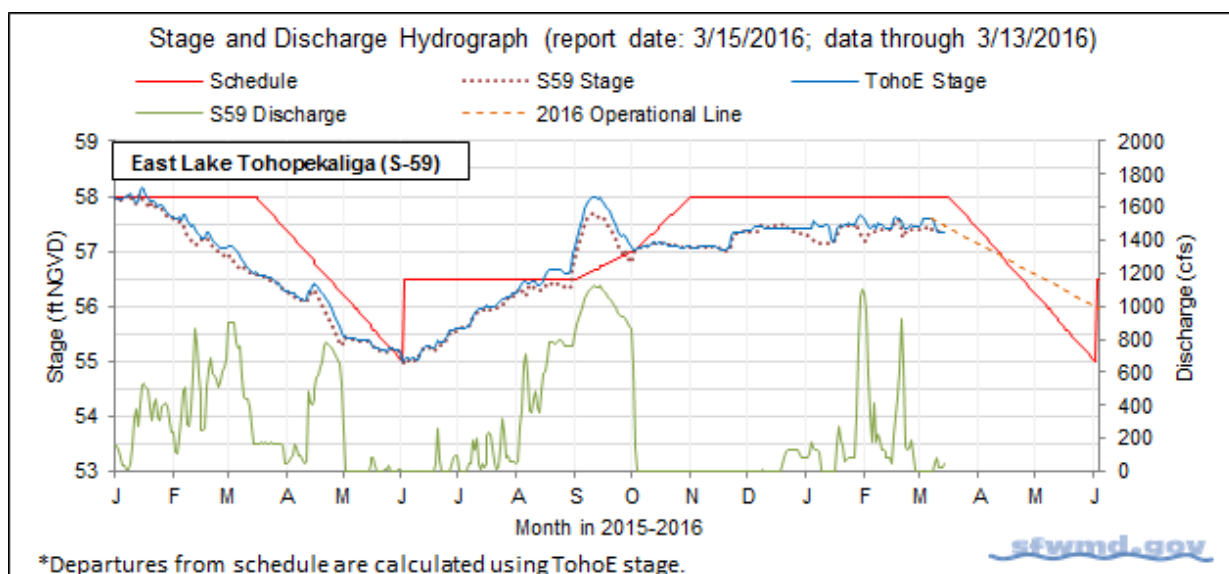


Figure 1.

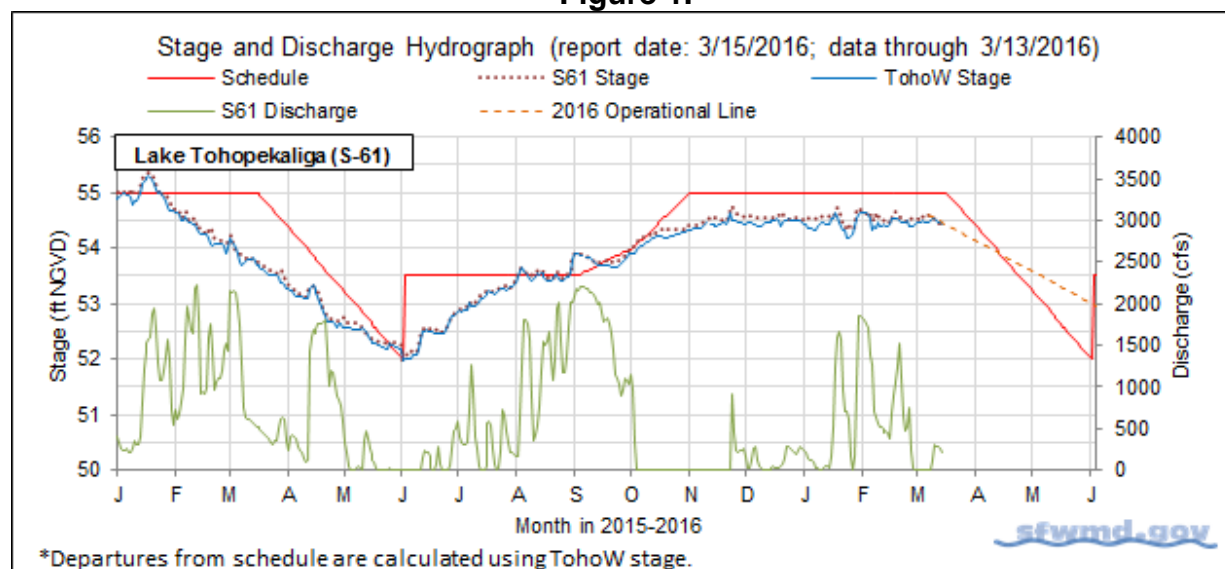


Figure 2.

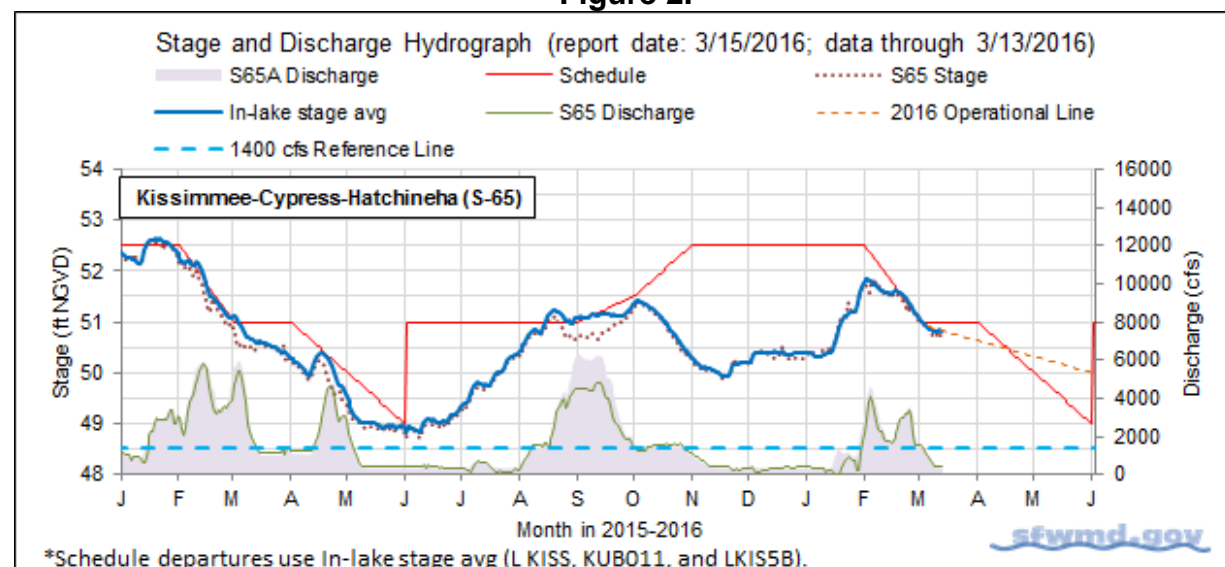


Figure 3.

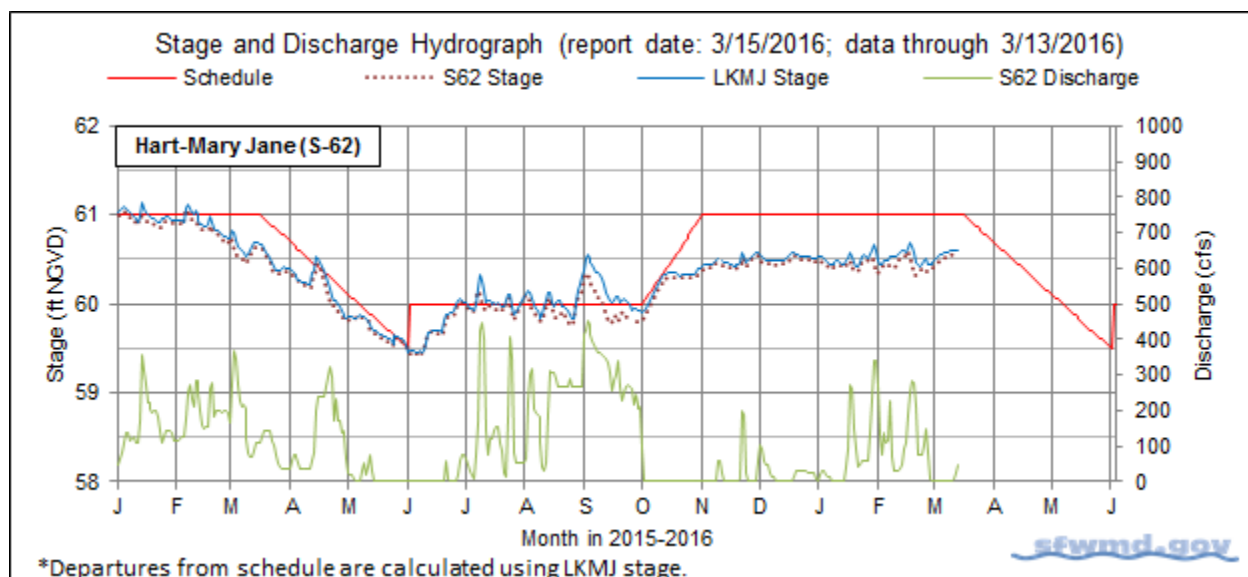


Figure 4.

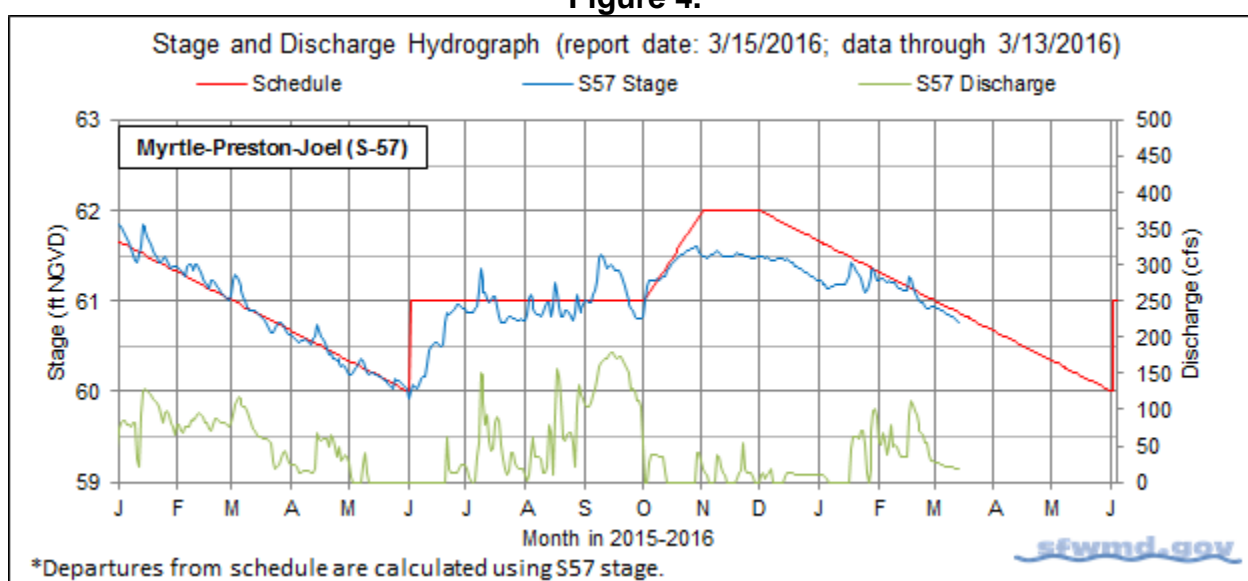


Figure 5.

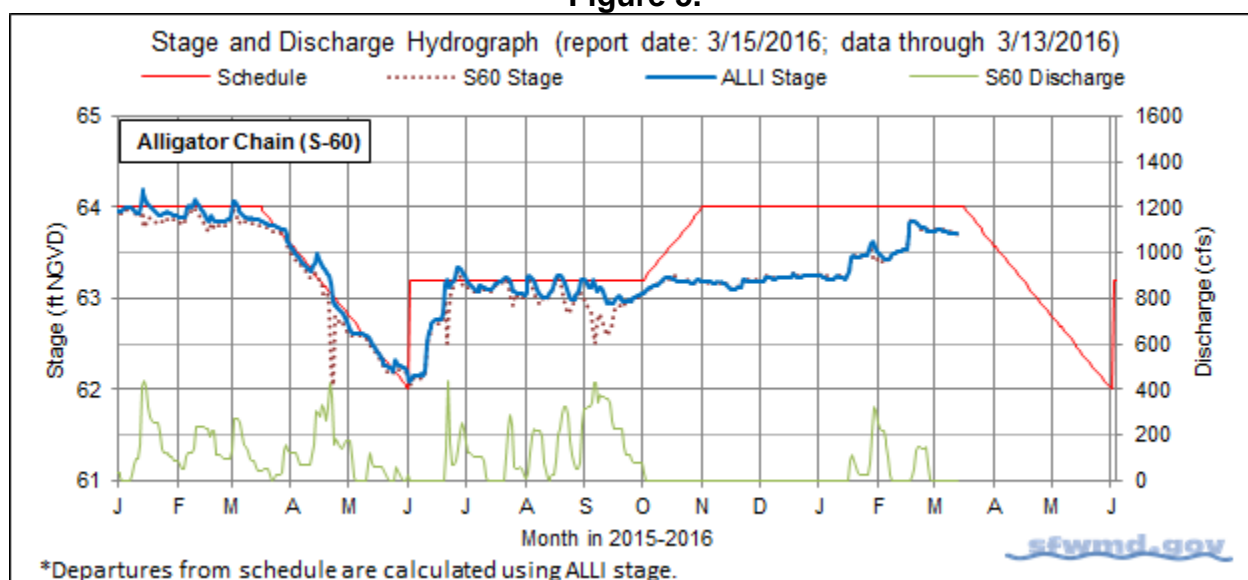


Figure 6.

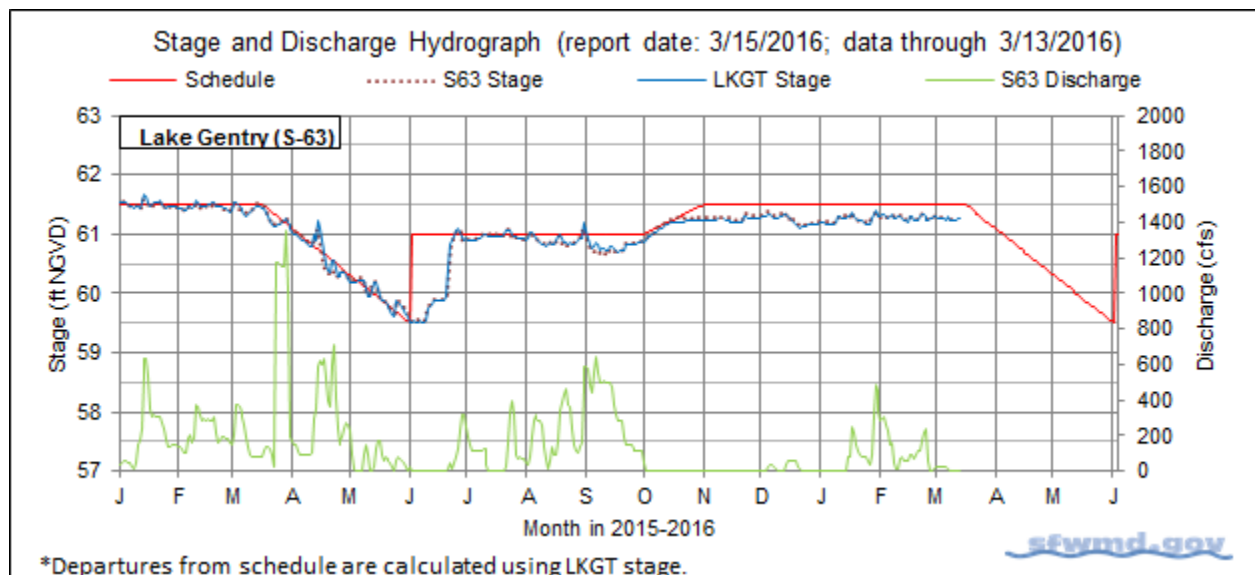


Figure 7.

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Limits on Rate of Discharge Change at S65/S65A During F&W Recessions for Dry Season 2015-2016

Table 2. Maximum discharge rate of change limits for S65/S65A for use during departures after stage has intersected the KCH F&W recession line. These are maximum rates and should be implemented with discretion and as slowly as possible.

****Rate limits apply only in Zone B****

		Departure (ft) above the F&W line				Departure (ft) below the F&W line				
		≤ 0.5	> 0.5	> 0.75	> 1.0	≥ -0.3	< -0.3	< -0.5	< -0.75	< -1.0
	Q (cfs)	Maximum rate of increase (cfs/day)				Maximum rate of decrease (cfs/day)				
Zone B	0-300	50	100	150	200	-50	-100	-150	-200	-250
	300-1400	150	300	450	600	-75	-150	-225	-300	-375
	1400-2500	300	600	800	800	-300	-600	-600	-600	-600
	2500-3000	1000	1000	1000	1000	-600	-600	-600	-600	-600
Zone A		No limits								

*S65 discharge plan for Wet Season 2015 was discontinued on January 20, 2016 to allow lake stage to rise by Feb 1 as conditions permit. From 2015-2016 dry season standing recommendation.

Figure 8a. Limits on rate of discharge change at S65/S65A during F&W recession for dry season 2015-2016. Table 2 is from the 2015-2016 Dry Season Standing Recommendation.

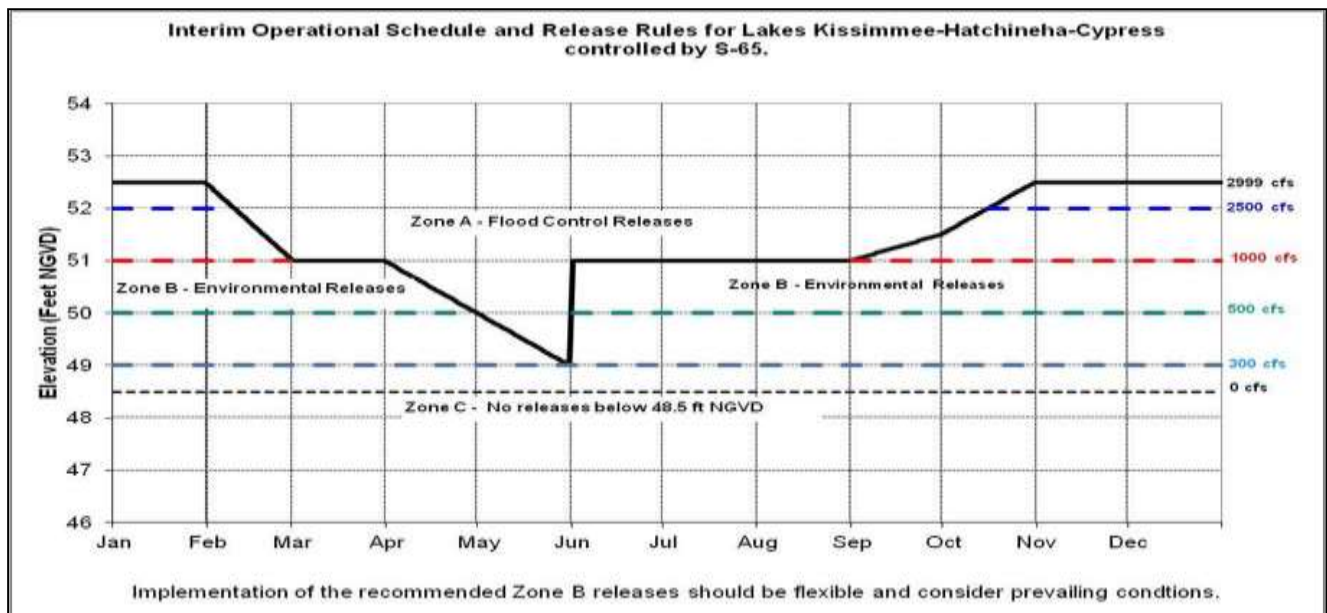


Figure 8b. Interim operations schedule for S-65. The discharge schedule shown to the right has not been used in recent years or in Wet Season 2015.

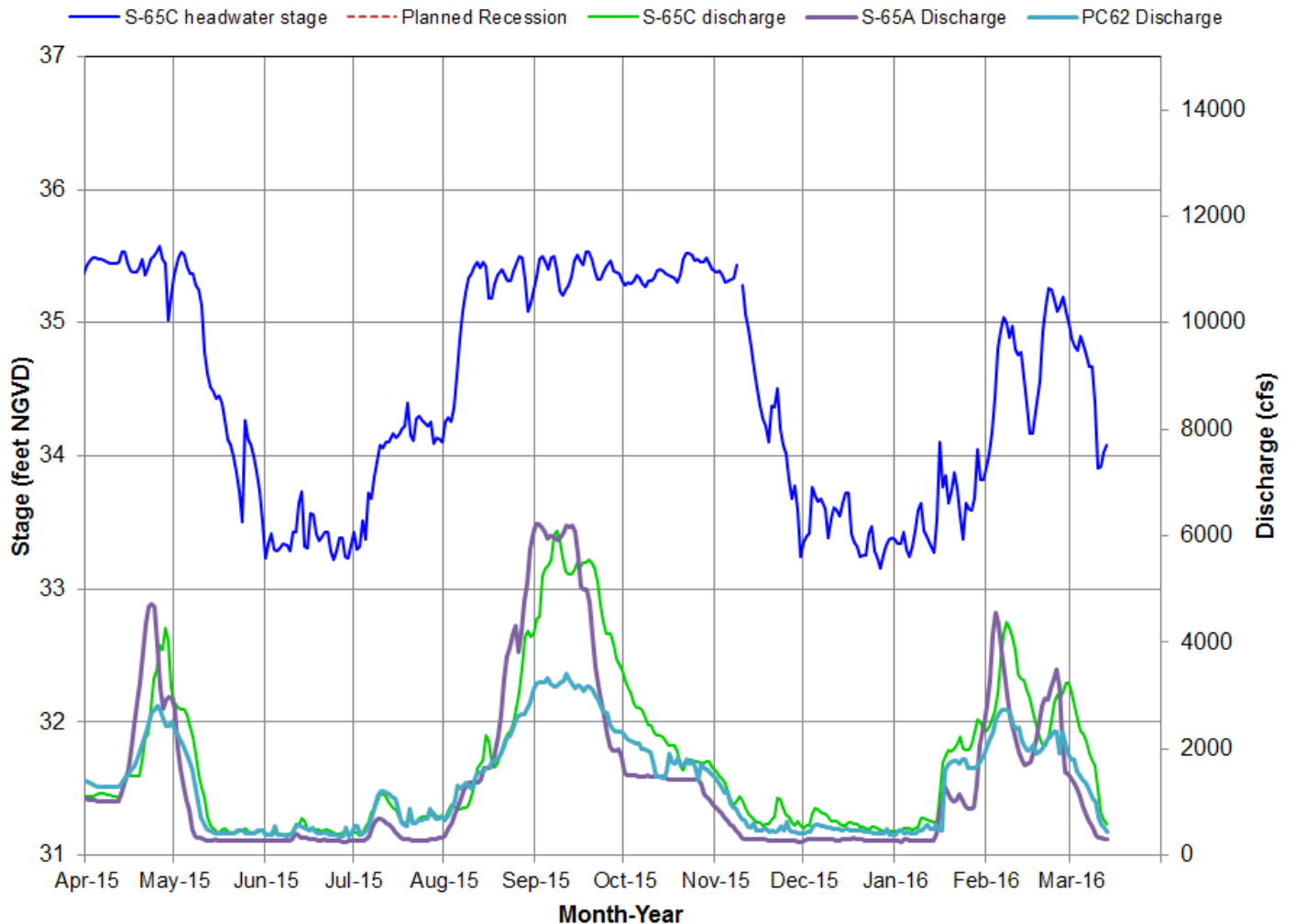


Figure 9. S-65C headwater stage in relation to discharge at S-65C, S-65A, and PC62.

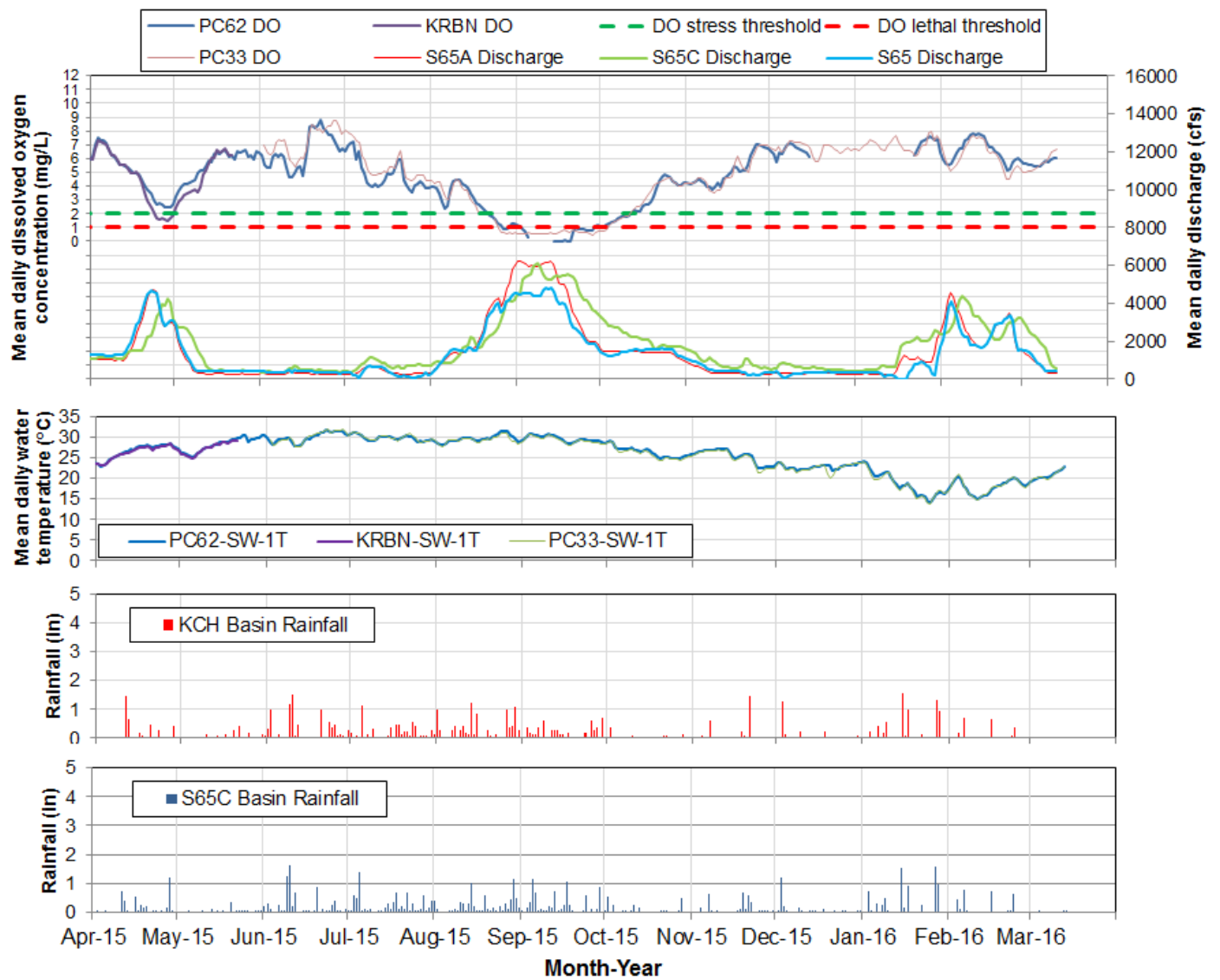
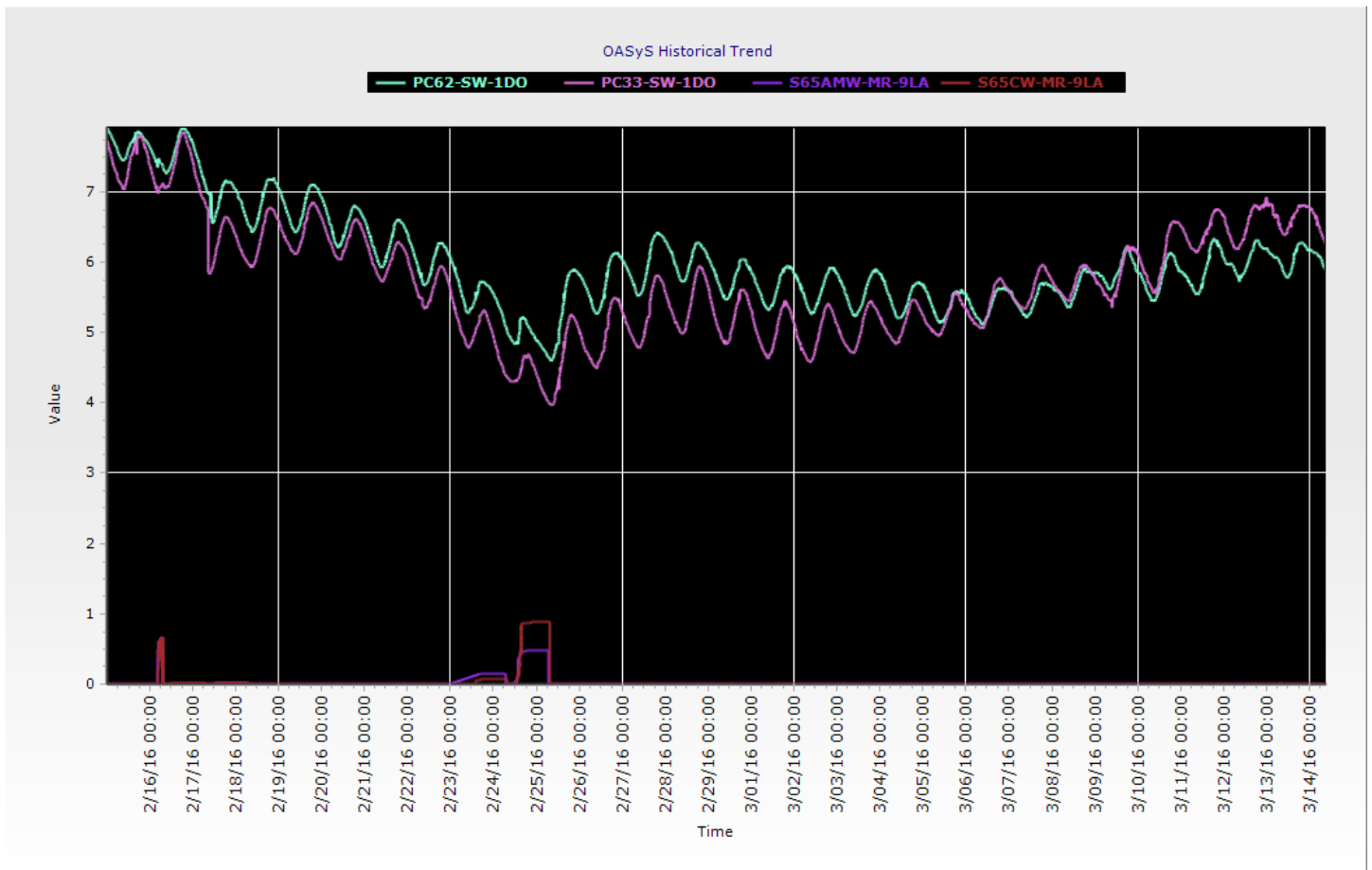


Figure 10. Mean daily Dissolved Oxygen, discharge, temperature and rainfall in the Phase I river channel.



Insert A. Phase I river channel Dissolved Oxygen (measured at 15 minute intervals) and rainfall at S65A and S65C.

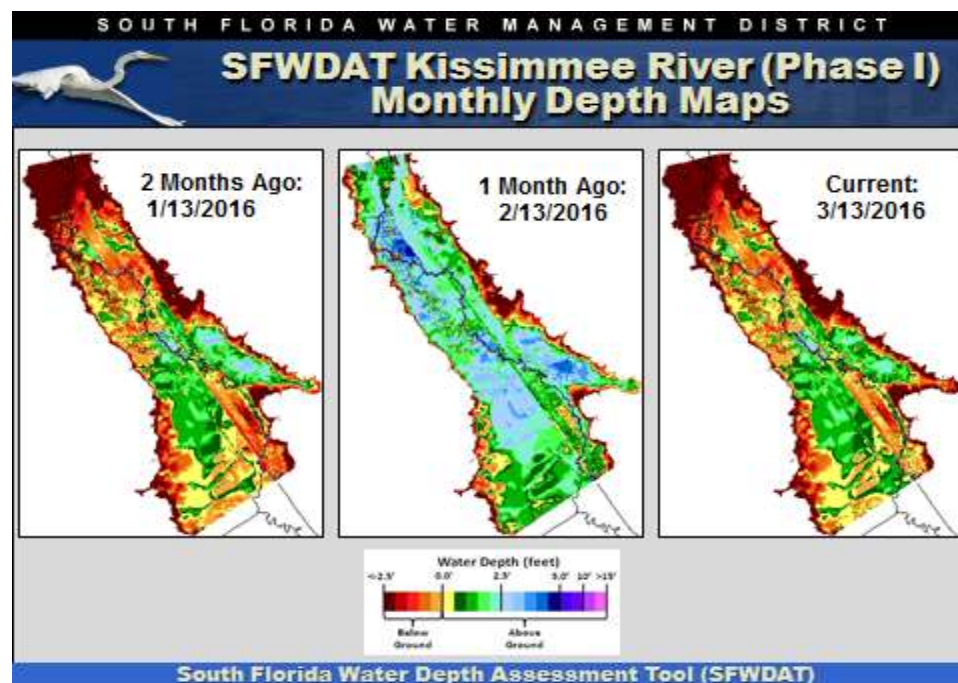


Figure 11. Phase I area floodplain water depths for this week, one month ago, and two months ago. Note that the WDAT color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to Jan. 16, 2012.

Kissimmee River Hydrographs

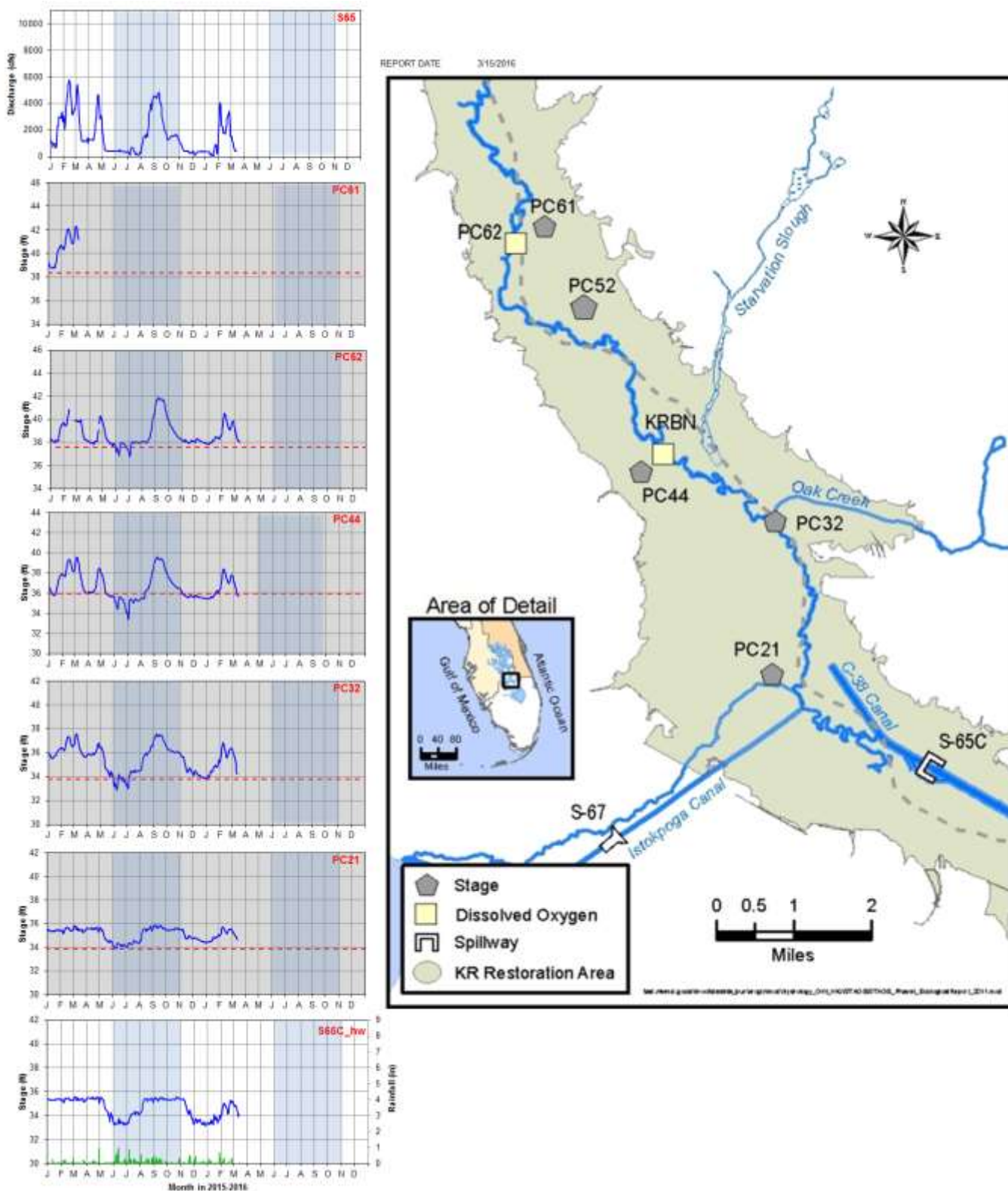


Figure 12. Discharge at S65, stages at five monitoring stations in the Phase I area of the Kissimmee River floodplain, and headwater stage at S65-C since January 1, 2013. The most recent data (~2 weeks) are provisional real-time data from SFWMD DualTrend; previous data are from SFWMD DB-HYDRO (validated). Dashed lines are ground elevations.

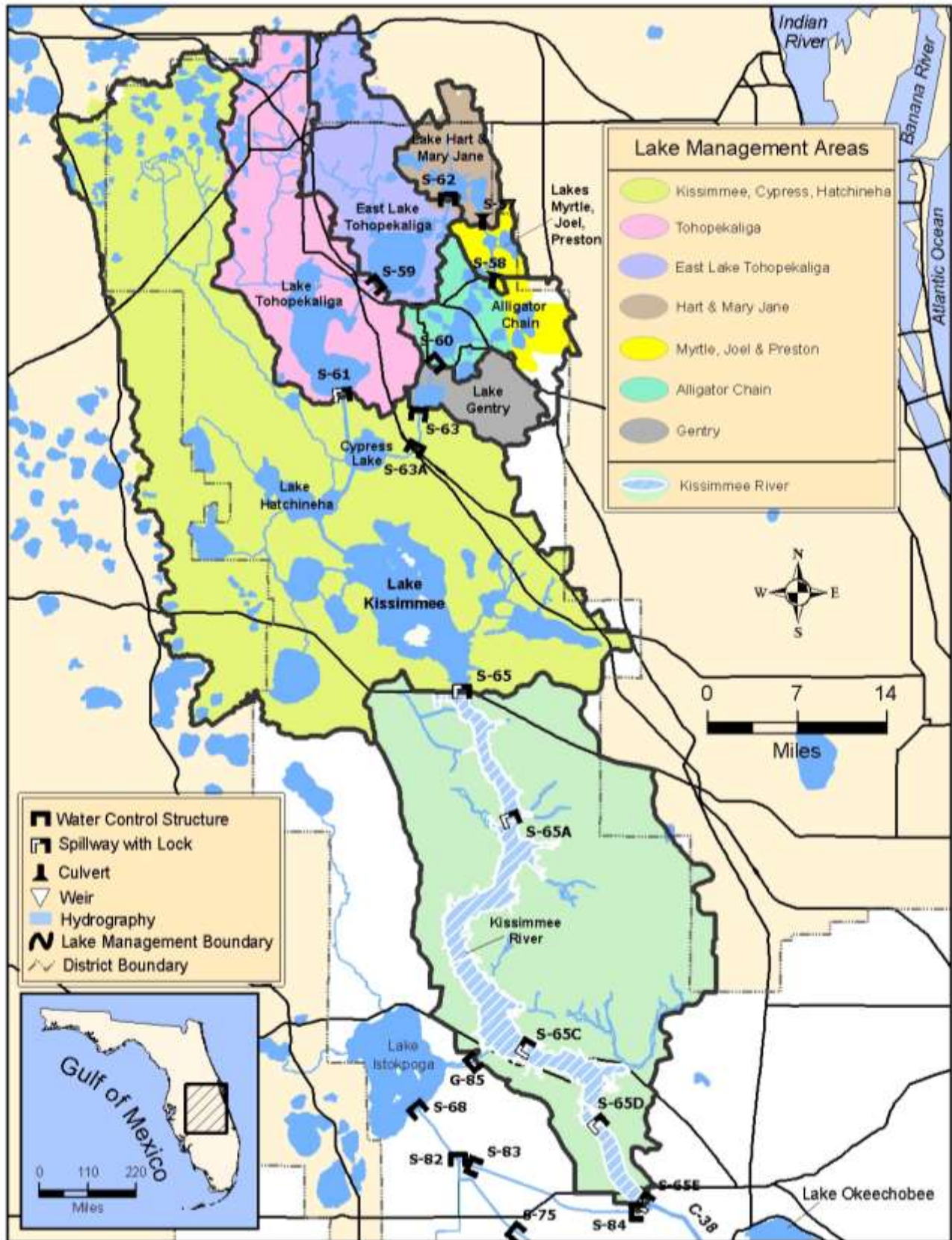


Figure 13. The Kissimmee Basin

LAKE OKEECHOBEE

According to the USACE web site, Lake Okeechobee stage is at 15.41 feet NGVD for the period ending at midnight on March 14, 2016. This value is based on the use of four interior Lake stations (L001, L005, L006, and LZ40) and four perimeter stations (S352, S4, S308 and S133). Lake stage decreased by 0.24 feet over the past week. The Lake is 0.83 feet lower than it was a month ago and 0.82 feet higher than it was a year ago (Figure 1). The Lake is in the Low Flow Sub-band (Figure 2). According to RAINДАР, 0.01 inches of rain fell directly over the Lake during the past seven days. Similar amounts of rainfall fell in the surrounding watershed while no rainfall was recorded in portions of the northern and southern watershed (Figure 3).

Based on USACE reported values, current Lake inflow is approximately 1,384 cfs, consisting of flows as indicated below.

Structure	Flow cfs
S65E	623
S154	0
S84 & 84X	612
S71	93
S72	0
C5(Nicodemus slough dispersed storage)	-137
S191	0
S133 PUMPS	0
S127 PUMPS	0
S129 PUMPS	0
S131 PUMPS	0
S135 PUMPS	0
Fisheating Creek	193
S2 Pumps	0
S3 Pumps	0
S4 Pumps	0

Current Lake outflow is approximately 7,194 cfs exiting at S77 (3,804 cfs), S308 (1,568 cfs), S351 (867 cfs), S354 (568 cfs), S352 (215 cfs) and to the L8 canal through Culvert C10A (172 cfs). Water supply demands are increasing in the EAA resulting in increased flows through S351, 352, and 354. Corrected evapotranspiration value based on the L006 weather platform solar radiation data for this past week was 1,100 cfs.

Change in elevation equivalents and average weekly flows for major structures are presented in Figure 4. Values for S77 and S308 are based on the lower structure gauges as are the instantaneous values presented above.

Based on the Lake Okeechobee wading bird habitat suitability index, there are currently approximately 40,995 acres of potentially suitable foraging habitat on the Lake for long-legged wading birds, and 8,092 acres of potentially suitable foraging habitat for short-legged wading birds (Figure 5). Thirty-six active snail kite nests (31 new nests) and 225 snail kites were observed in the marsh during the March snail kite survey (Figure 6).

The most recent MODIS satellite images (March 6 and 10) indicate the absence of potential algal bloom conditions on the Lake. Colored pixels noted on the March 10 image reflect edge effects associated with cloud cover (Figure 7).

Water Management Recommendations

The winter/spring dry season recession has continued now for five weeks with a decrease of 0.24 feet this past week. Future short-term recommendations will depend in large measure on the near-term rainfall patterns and amounts. Actions which contribute to continuing the recession are essential to protect critical components of the Lake's floral (bulrush and submerged aquatic vegetation) and faunal (wading birds, snail kites and fish) communities. The operational goal continues to be to maintain a small but steady decrease in water levels not to exceed 1.1 feet per month (0.26 feet/week) to achieve a Lake stage of approximately 12.5 feet NGVD by the end of the dry season and to avoid additional reversals in Lake stage.

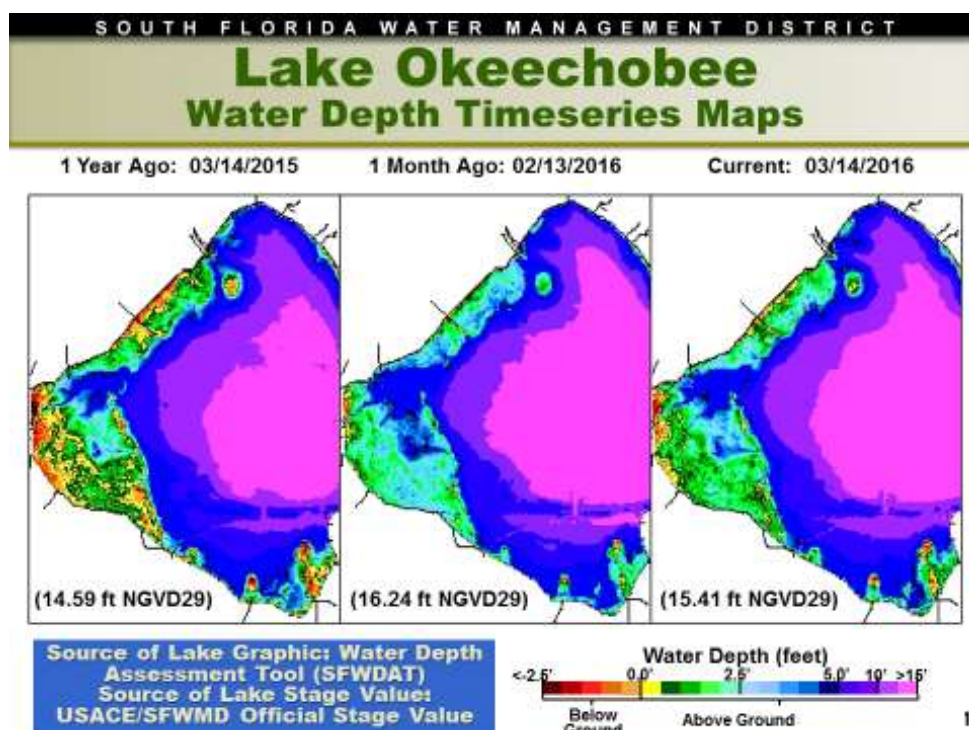


Figure 1

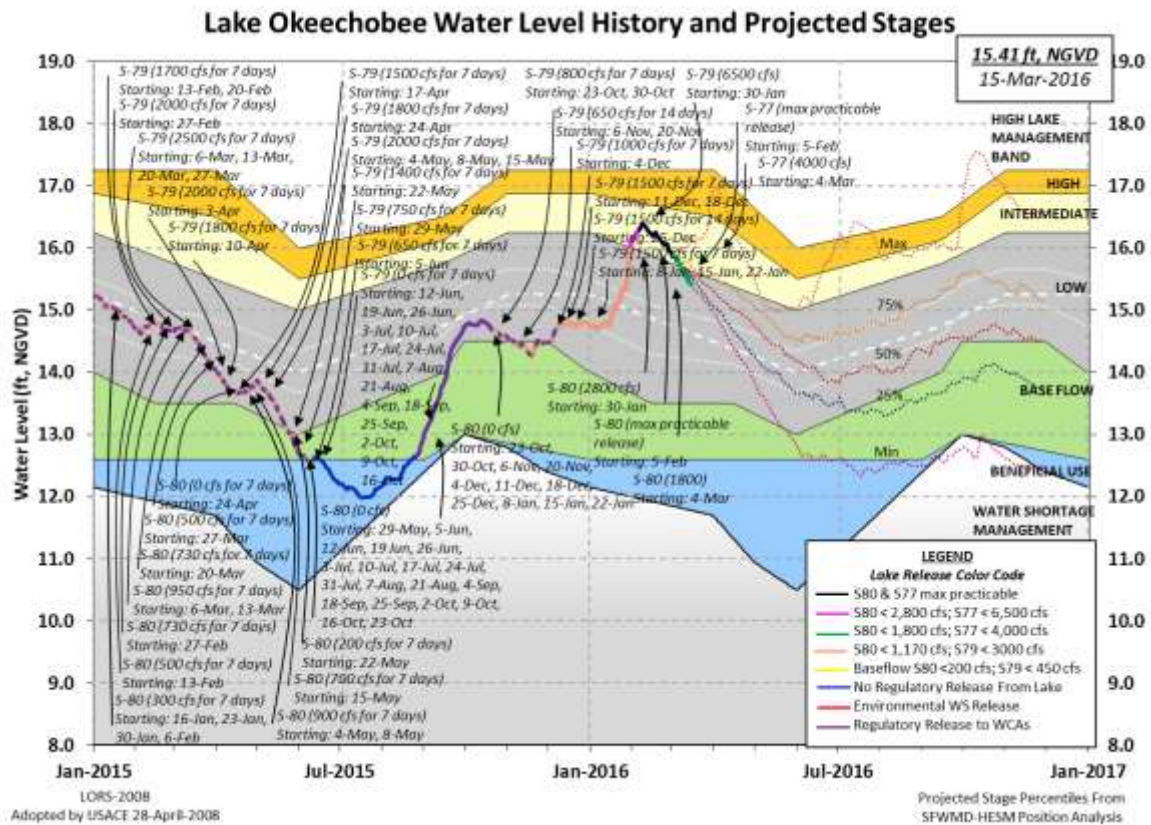


Figure 2

SFWMD PROVISIONAL RAINDAR 7-DAY BASIN RAINFALL ESTIMATES

FROM: 0515 EST, 03/08/2016

THROUGH: 0515 EST, 03/15/2016

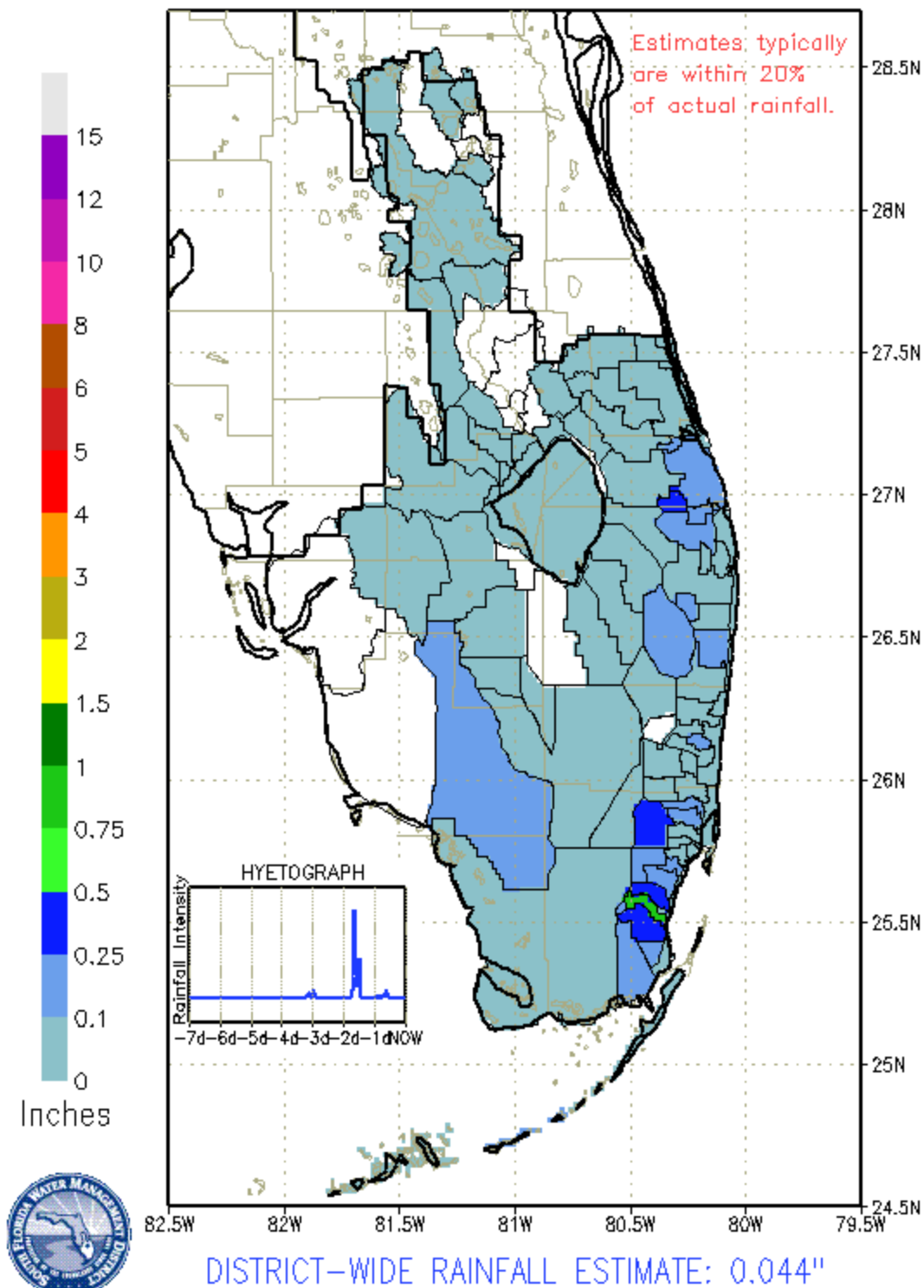


Figure 3

INFLOWS	Average Daily Flow Past Week cfs	Feet of Change Past Week
S65E	1124	0.036
S71 & 72	125	0.004
S84 & 84X	238	0.008
Fisheating Creek	489	0.016
Rainfall	N.A.	0.001
OUTFLOWS	Average Daily Flow Past Week cfs	Feet of Change Past Week
S77	3804	0.123
S308	1568	0.051
S351	903	0.029
S352	222	0.007
S354	551	0.018
L8	197	0.006
ET	1100	0.036

Figure 4

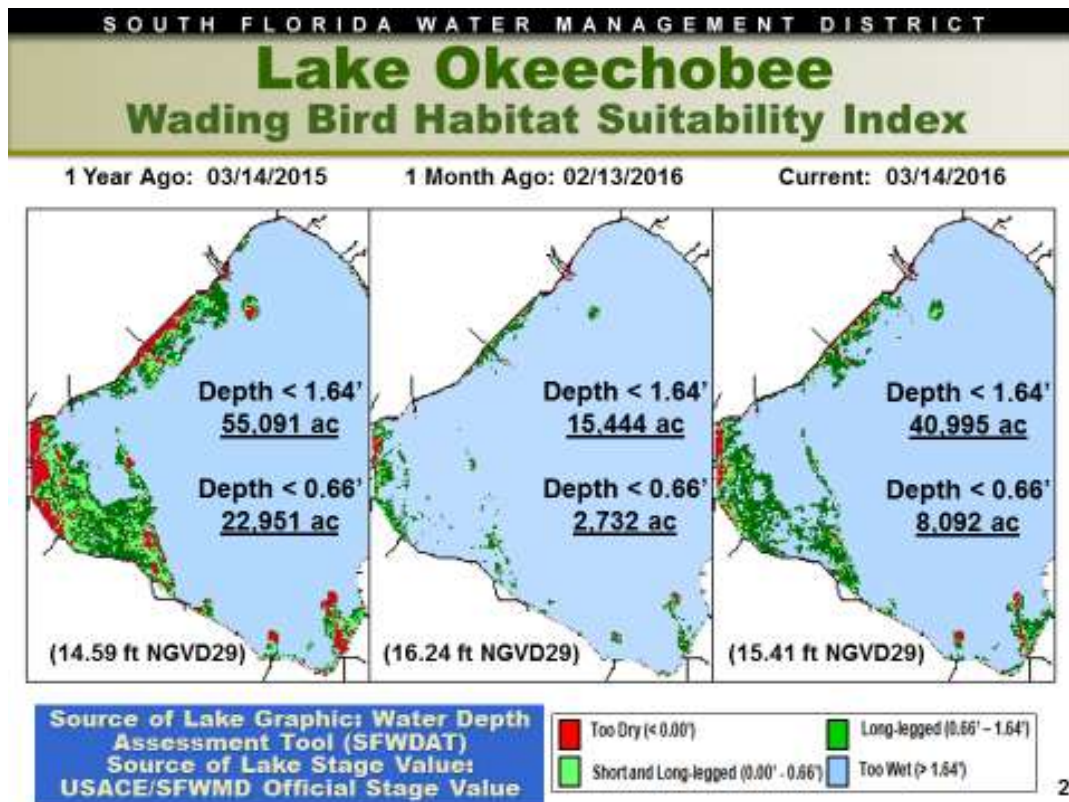


Figure 5

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Lake Okeechobee

Snail Kites



March 2016
36 Active Nests (31 new)
225 Snail Kites observed

Figure 6

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Lake Okeechobee

Algal Blooms

Unvalidated and Experimental Data

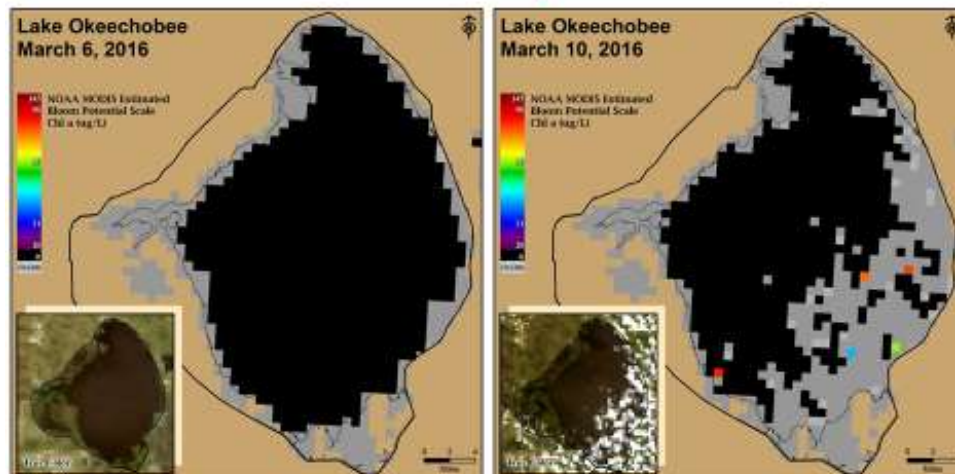


Figure 7

Lake Istokpoga

Lake Istokpoga stage is 39.34 feet NGVD today and is currently 0.16 feet below its regulation schedule of 39.50 feet NGVD, which remains at peak high pool (Figure 8). Average flows into the Lake from Arbuckle and Josephine creeks were 323 and 90 cfs respectively, a small decrease from the preceding week. Average discharge from S68 and S68X this past week was 232 cfs, a significant decrease compared to the preceding week. According to RAINDAR, 0.01 inches of rain fell in the Lake Istokpoga watershed during the past seven days. Twenty-one active snail kite nests (17 new nests) and 85 snail kites were observed during the March snail kite survey (Figure 9).

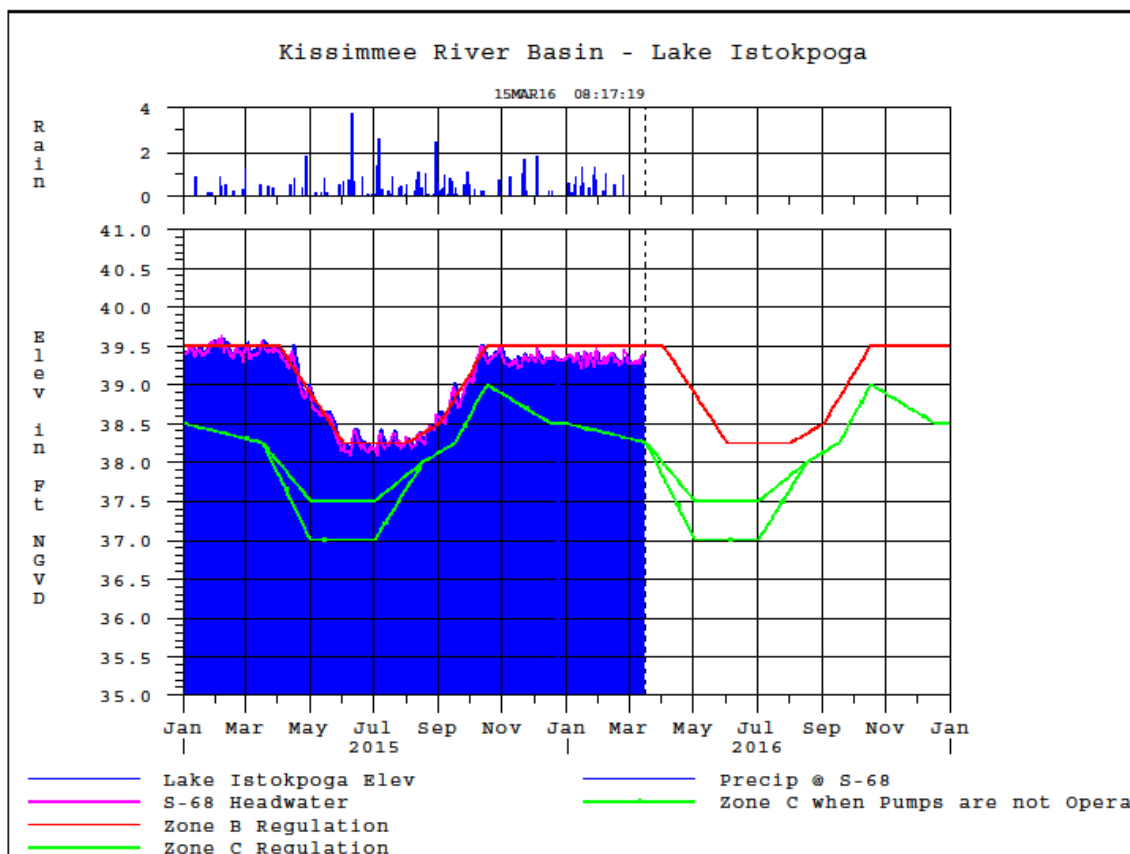


Figure 8

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Lake Istokpoga

Snail Kites



March 2016

21 Active Nests (17 new)

85 Snail Kites observed

Figure 9

ESTUARIES

St. Lucie Estuary

Over the past week, provisional flows averaged 1,976 cfs at S-80, 1,597 cfs downstream of S-308, 0 cfs at S-49 on C-24, 18 cfs at S-97 on C-23, and 92 cfs from Ten Mile Creek at the Gordy Road Structure. Average inflow from tidal basin tributaries is estimated to be 117 cfs (Figures 1 and 2). Total inflow averaged about 2,203 cfs last week and 4,140 cfs over last month.

Over the past week, surface salinity increased throughout the estuary (Table 1, Figures 3 and 4). The seven-day moving average salinity of the water column at the US1 Bridge is about 2.1. Salinity conditions in the middle estuary are in the poor range for the adult eastern oyster.

Table 1. Seven-day average salinity at three monitoring stations in the St. Lucie Estuary. Current average is in bold face type, previous average in parentheses. The envelope reflects the preferred salinity range for adult eastern oysters (*Crassostrea virginica*) in the middle estuary.

Sampling Site	Surface	Bottom	Envelope
HR1 (N. Fork)	1.2 (0.7)	1.3 (1.3)	NA ¹
US1 Bridge	1.9 (1.6)	2.2 (3.1)	10.0-26.0
A1A Bridge	10.1 (7.2)	18.4 (18.9)	NA

¹Envelope not applicable

Oyster mortality was examined in the field on March 2, 2016 and seagrass monitoring was conducted on February 22, 2016. The results were included in the Appendix.

Caloosahatchee Estuary

During the past week, provisional flows averaged approximately 4,020 cfs downstream of S-77, 3,404 cfs at S-78, and 4,456 cfs at S-79. Average inflow from tidal basin tributaries is estimated to be 200 cfs (Figures 5 and 6). Total inflow averaged 4,656 cfs last week and 7,117 cfs over last month.

Over the past week, salinity remained about fresh in the upper estuary from S-79 to Ft. Myers Yacht Basin, and increased in the lower estuary from Cape Coral to Sanibel (Table 2, Figures 7 & 8). The seven-day average salinity values are within the poor range for adult oysters at Cape Coral and within the good range at Shell Point and at Sanibel (Figure 9). The 30-day moving average surface salinity is 0.2 at Val I-75 and at Ft. Myers. Salinity conditions at Val I-75 are in the good range for tape grass.

Table 2. Seven-day average salinity at six monitoring stations in the Caloosahatchee Estuary. Current average is in bold face type, previous average in parentheses. The envelope reflects the preferred salinity range for tape grass (*Vallisneria americana*) at Val I-75 and for adult eastern oysters (*Crassostrea virginica*) elsewhere.

Sampling Site	Surface	Bottom	Envelope
S-79 (Franklin Lock)	0.2 (0.2)	0.2 (0.2)	NA ¹
Val I75	0.2 (0.2*)	0.2* (0.2*)	0.0-5.0 ²
Ft. Myers Yacht Basin	0.2 (0.2)	0.2 (0.2)	NA
Cape Coral	3.1 (0.3)	4.3 (0.4)	10.0-30.0
Shell Point	19.6 (9.3)	20.5 (14.5)	10.0-30.0
Sanibel	NR ³ (22.4)	NR (25.1)	10.0-30.0

¹Envelope not applicable, ²Envelope is based on a 30-day average, ³Not Reporting

*Val I75 is temporarily offline due to bridge construction.

Salinity values are estimated using models developed for this site.

Oyster mortality was examined in the field on February 18, 2016 and seagrass monitoring was conducted on March 3, 2016. The results were included in the Appendix.

Monitoring data collected by the River, Estuary and Coastal Observing Network of Sanibel-Captiva Conservation Foundation using continuous sensors are summarized in Table 3 as concentration ranges of Chlorophyll *a* and dissolved oxygen at Beautiful Island, Ft. Myers, and Shell Point in the Caloosahatchee Estuary.

Table 3. Weekly ranges of Chlorophyll *a* (a measure of algal biomass) and dissolved oxygen concentrations at three monitoring stations maintained by the Sanibel-Captiva Conservation Foundation.

	RECON Monitoring Stations		
	Beautiful Island	Ft. Myers	Shell Point (Feb12-15)
Chlorophyll <i>a</i> (µg/l)	4.8 – 5.35	2.2 – 6.4	3.2 – 7.7
Dissolved Oxygen (mg/l)	6.0 – 7.3	7.2 – 8.9	5.2 – 7.7

The Florida Fish and Wildlife Research Institute reported on March 11, 2016, that *Karenia brevis*, the Florida red tide organism, was detected in background concentrations in one sample collected offshore of Lee County.

Water Management Recommendations

Given the current estuarine conditions, there are no ecological benefits associated with additional releases from Lake Okeechobee.

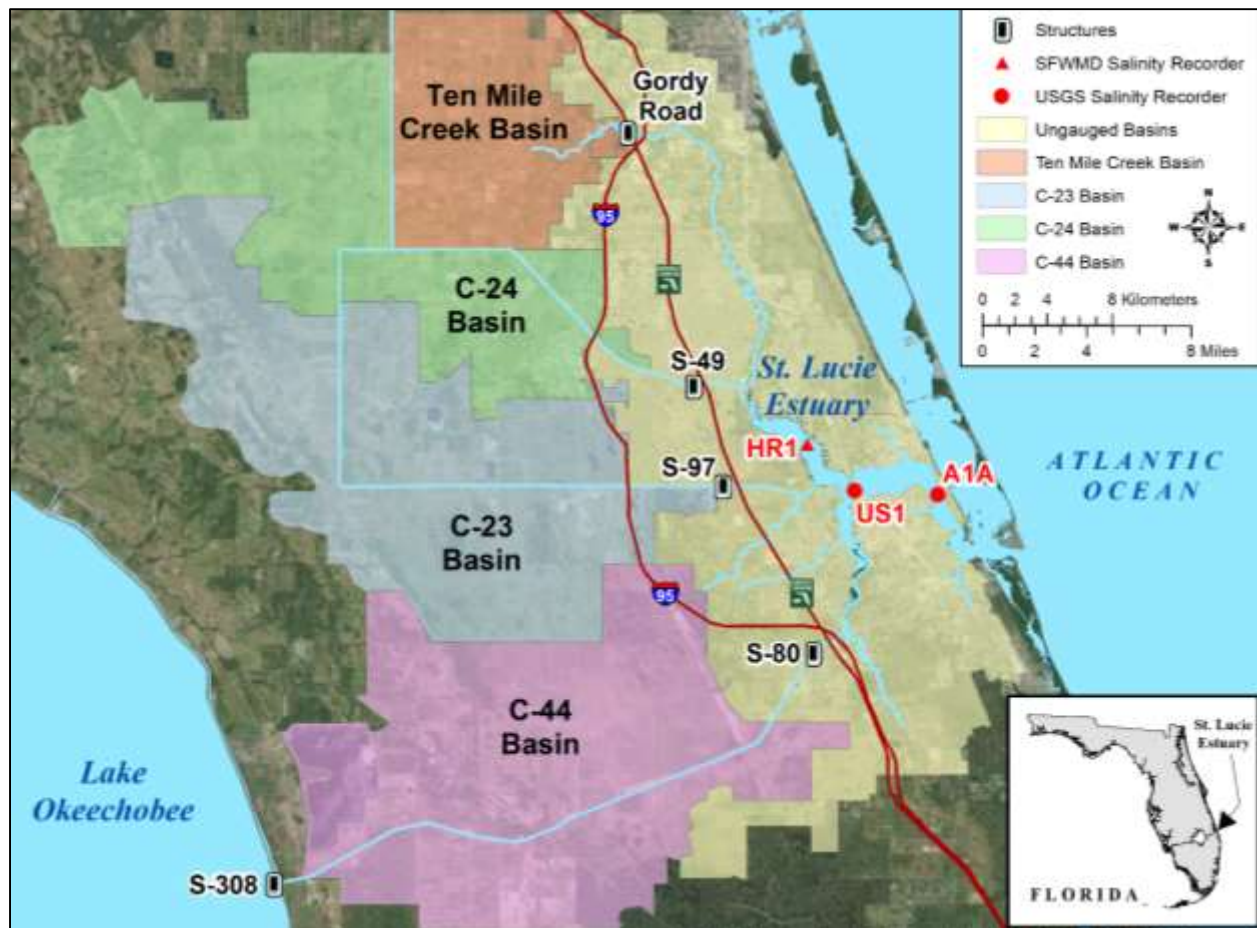


Figure 1. Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.

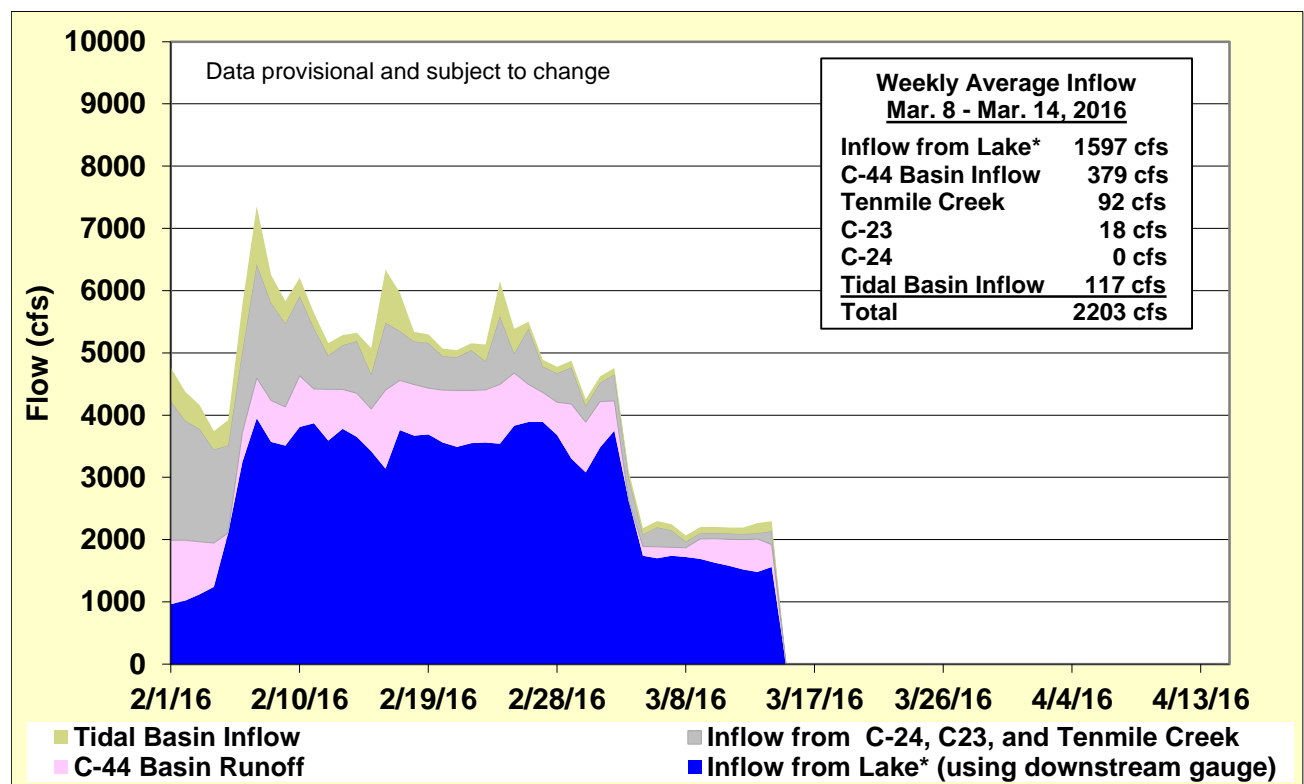


Figure 2. Estimated surface freshwater inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basins into the St. Lucie Estuary.

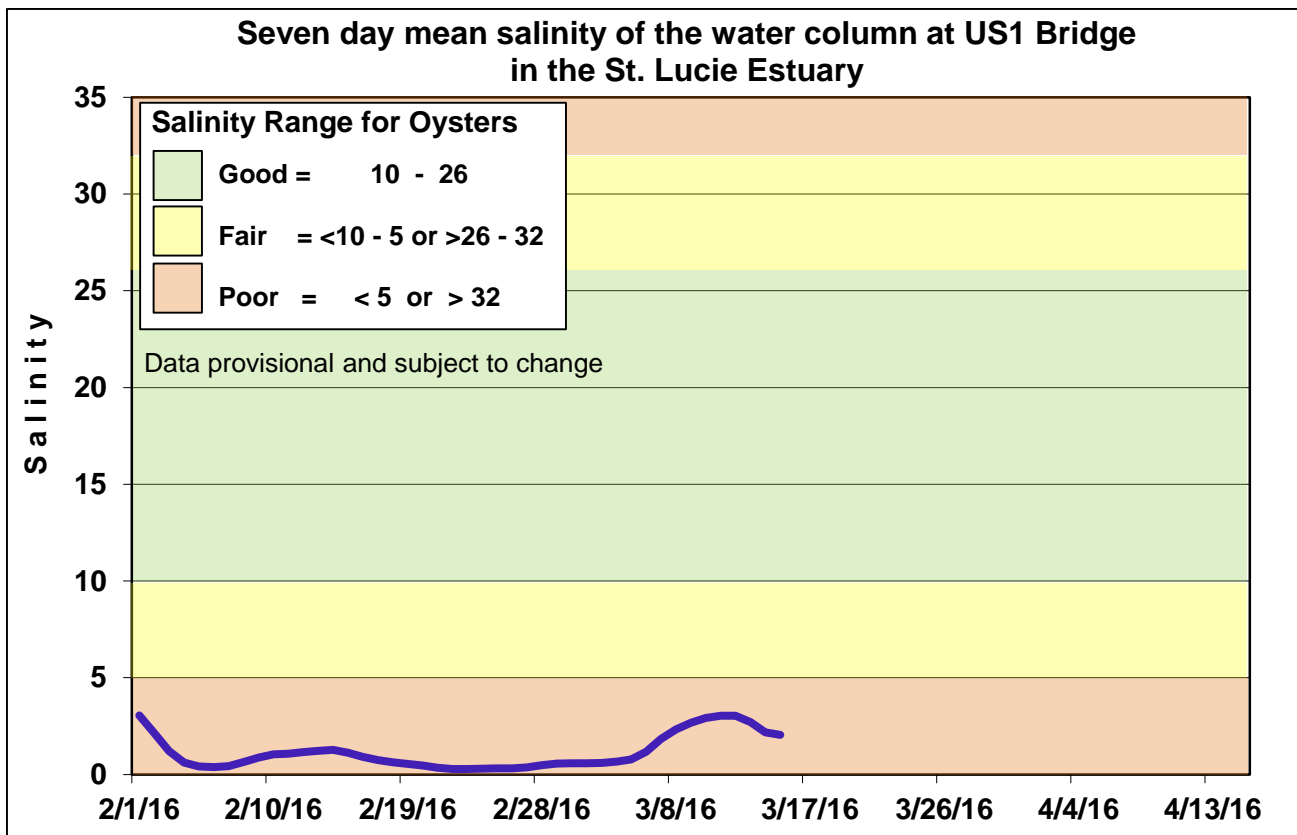


Figure 3. Seven-day mean salinity of the water column at the U.S. Highway 1 Bridge.

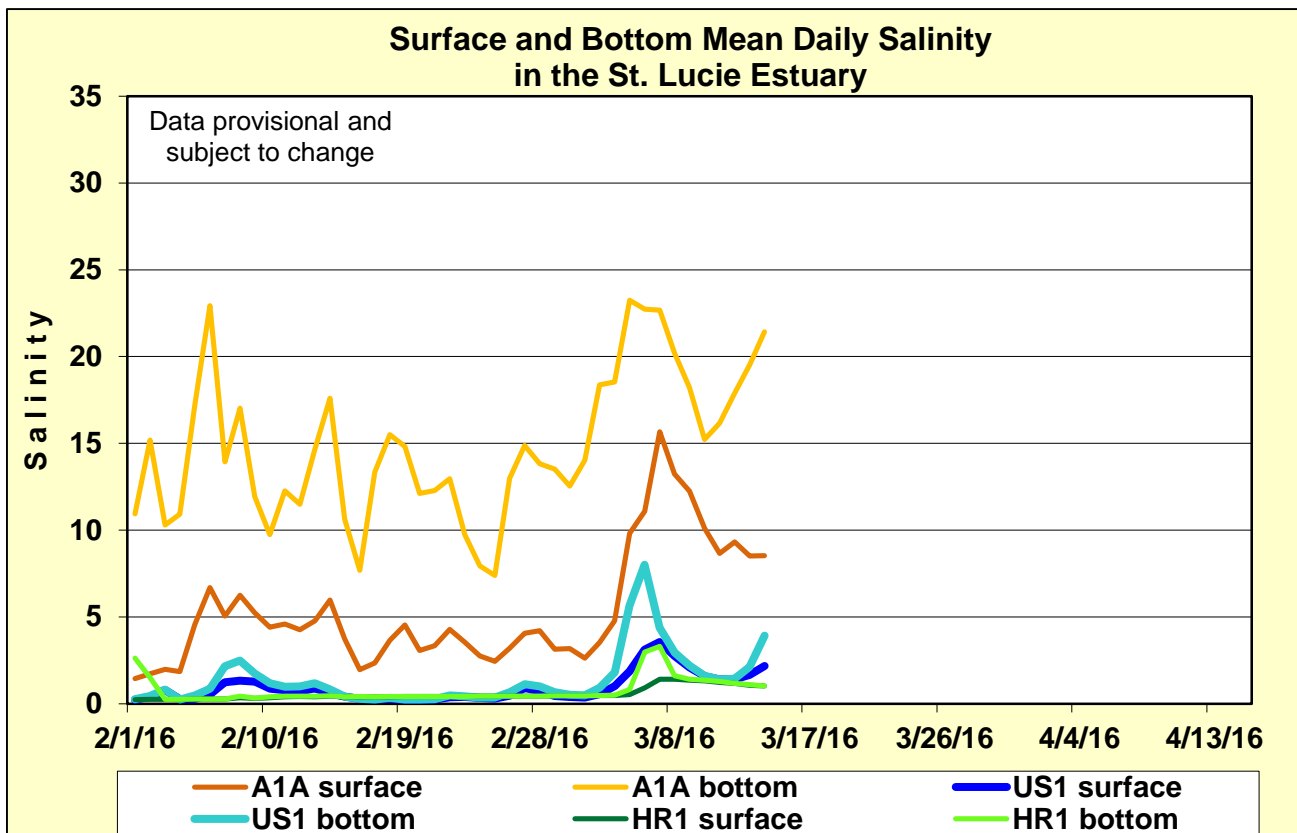


Figure 4. Daily mean salinity at the A1A, US1 and estimated HR1 stations.

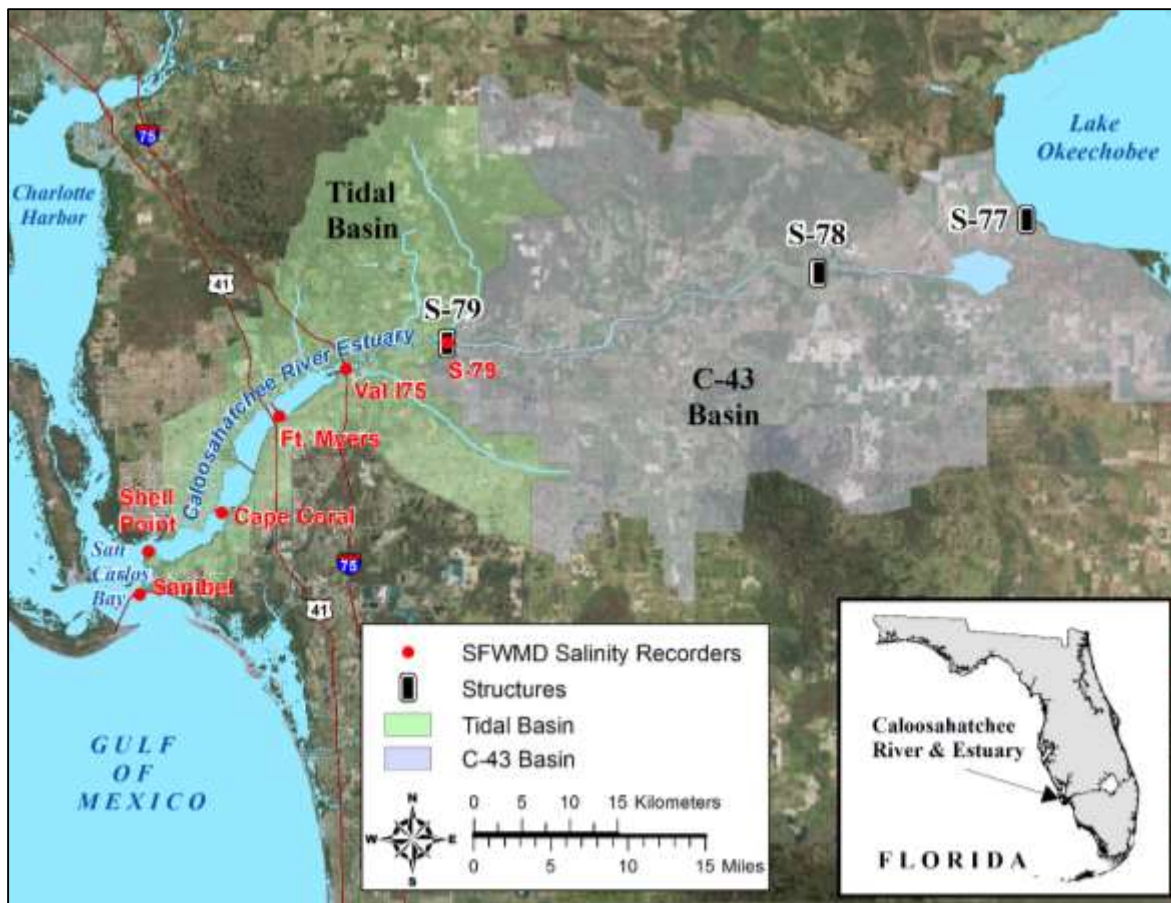


Figure 5. Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.

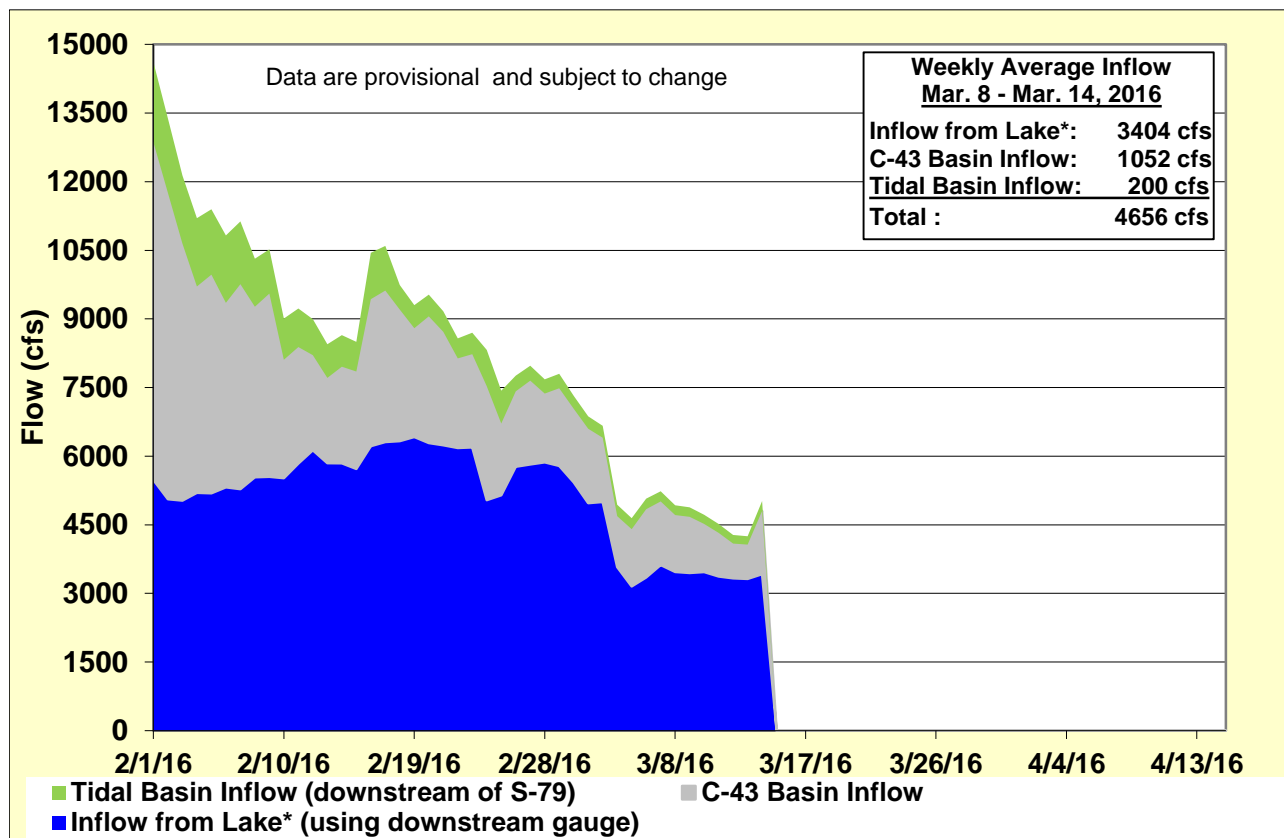


Figure 6. Freshwater inflows from Lake Okeechobee, runoff from the C-43 basin, and tributaries in the tidal basin into the Caloosahatchee River Estuary.

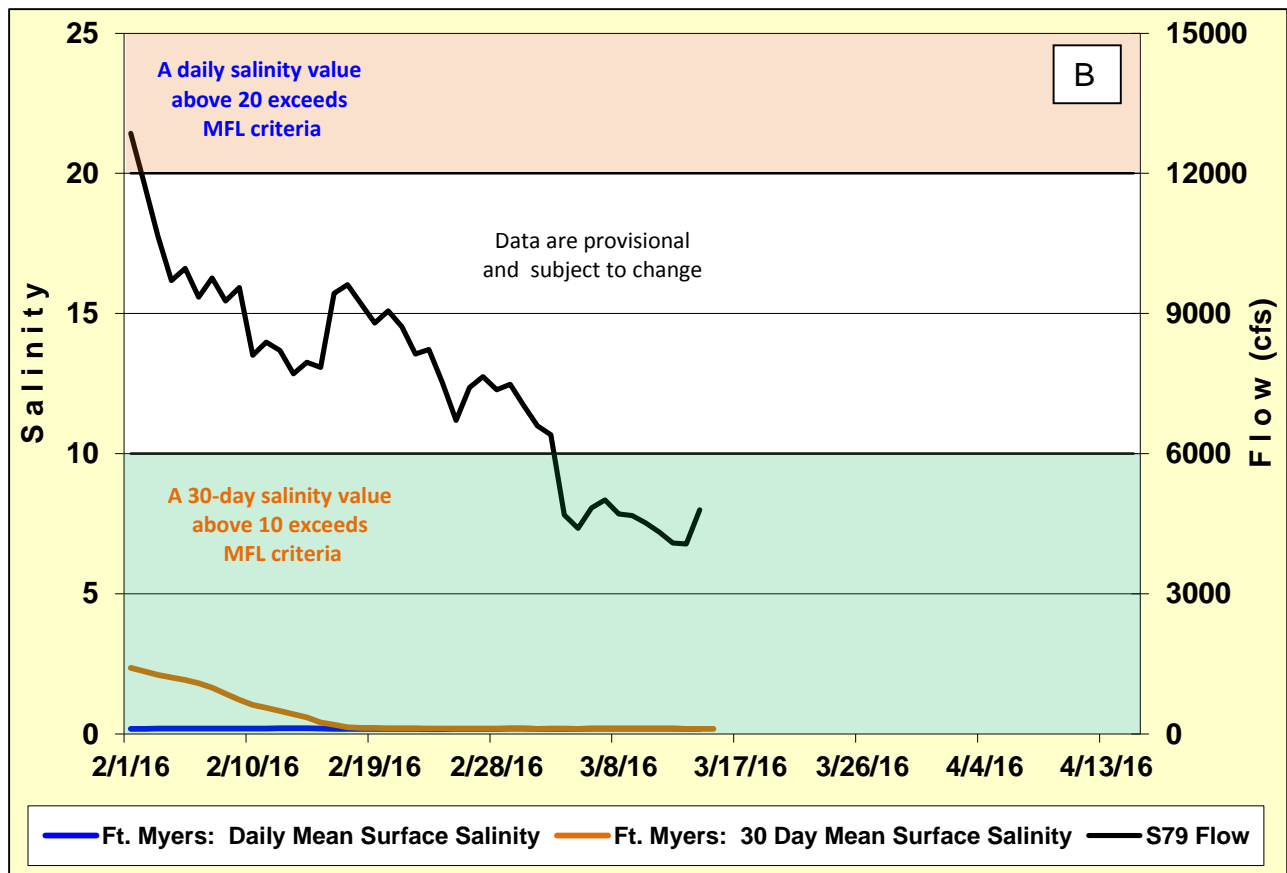
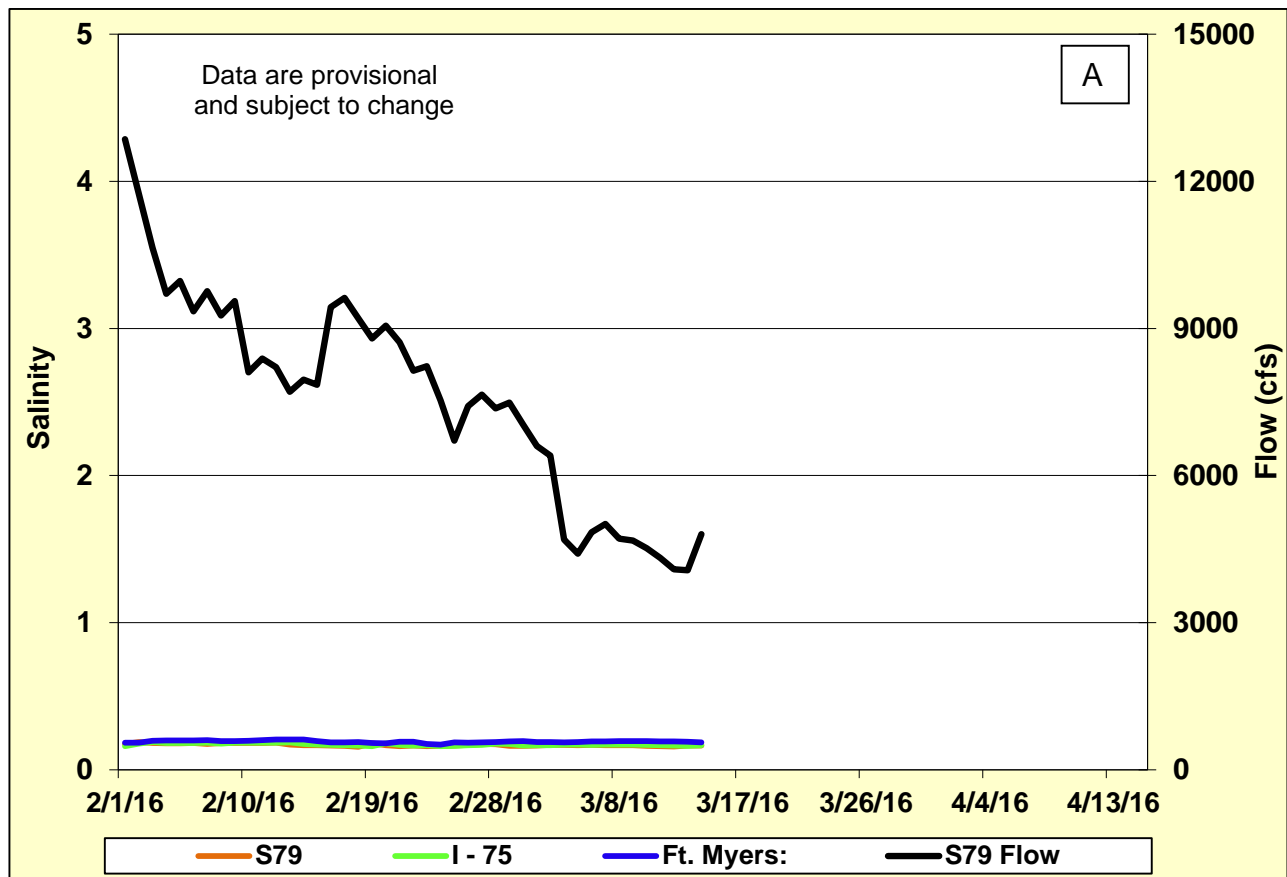


Figure 7. Daily mean flows at S-79 and salinity at upper estuary monitoring stations (A) and 30-day moving average salinity at Ft. Myers (B).

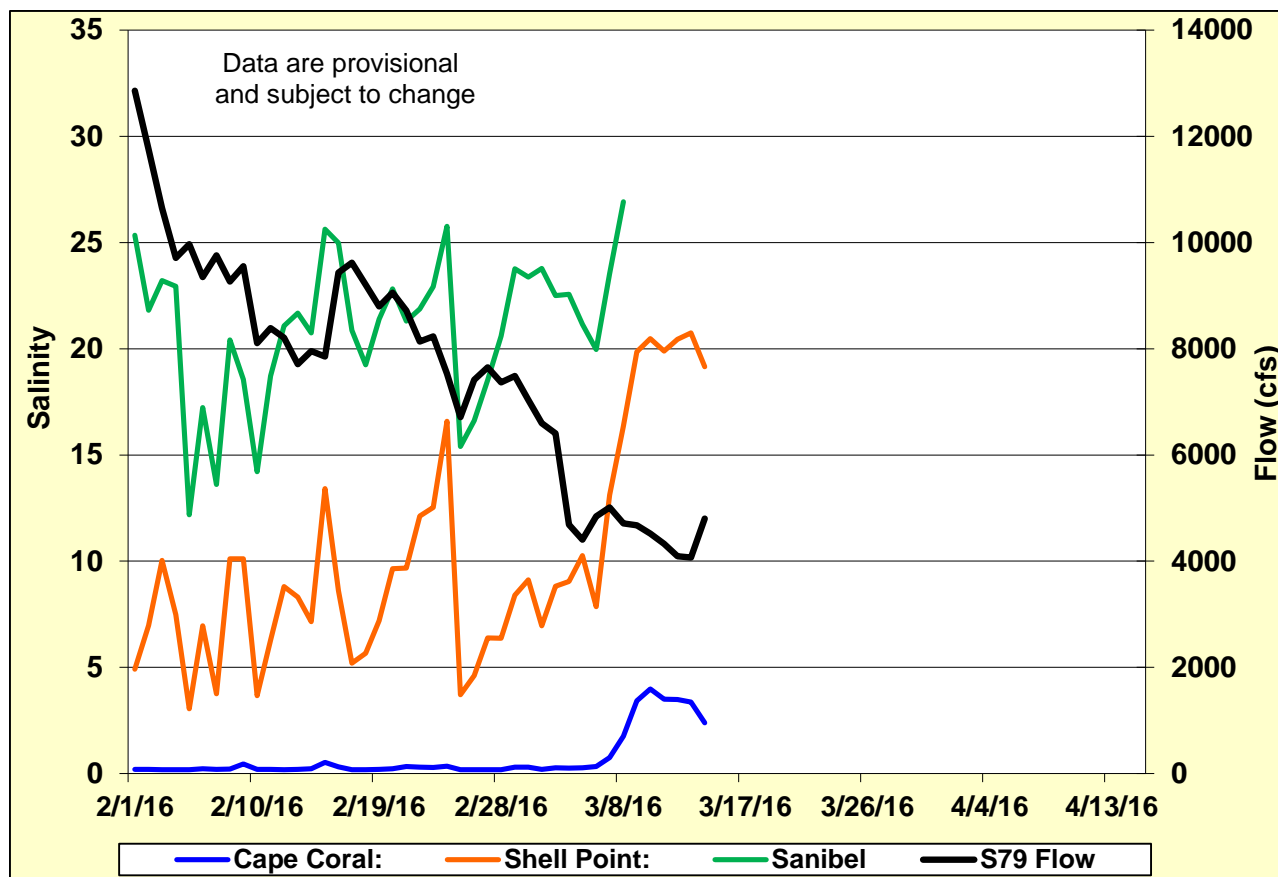


Figure 8. Daily mean flows at S-79 and salinity at lower estuary stations.

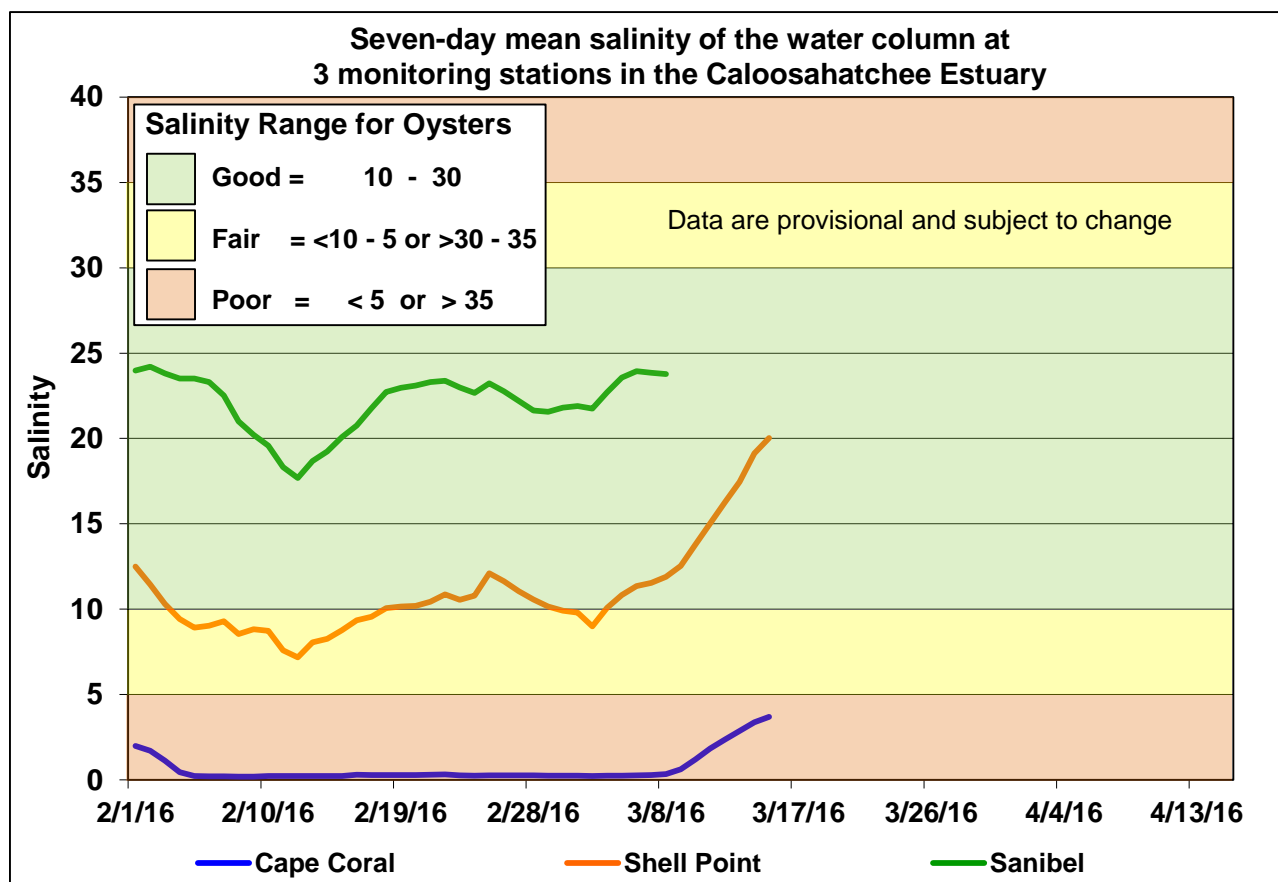


Figure 9. Seven-day mean salinity at Cape Coral Bridge, Shell Point and Sanibel Bridge monitoring stations.

APPENDIX

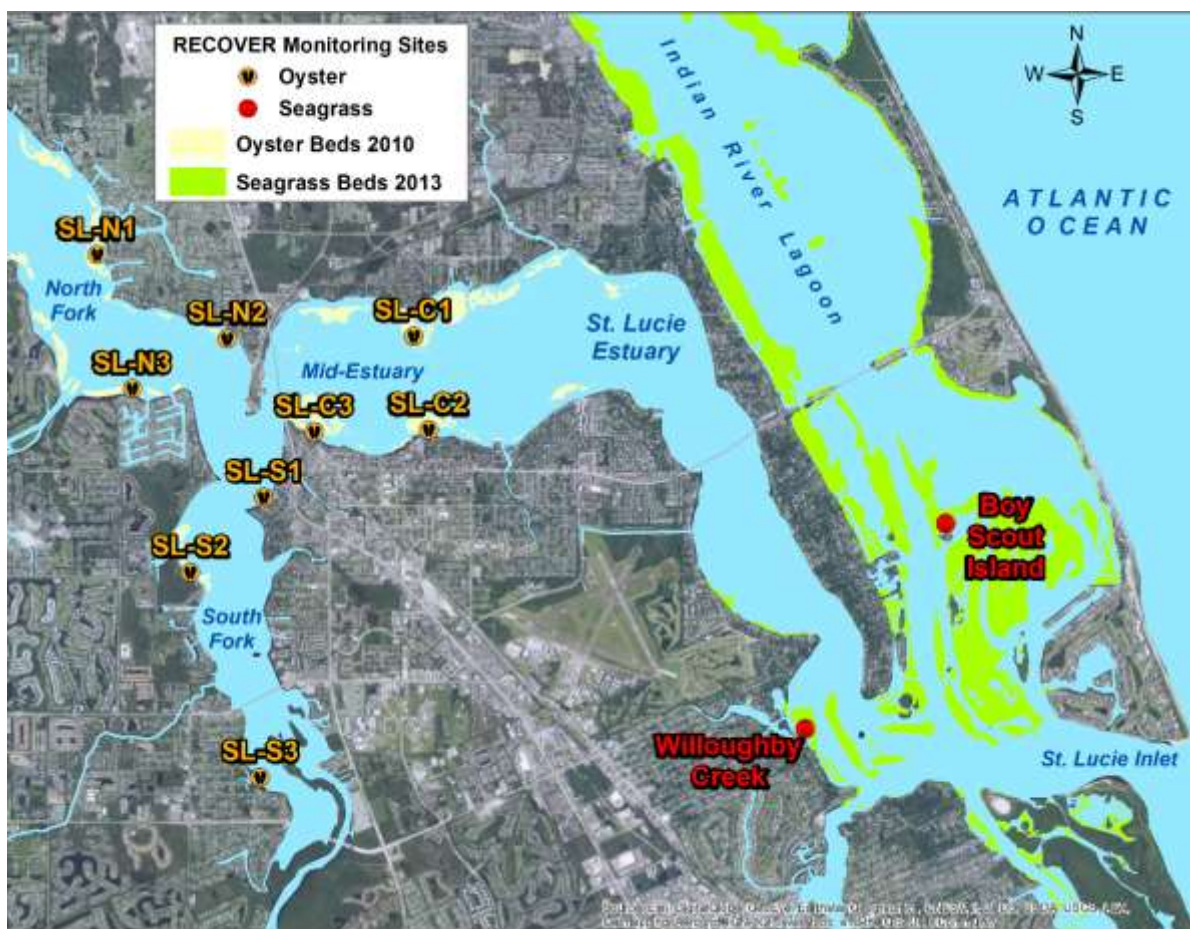


Figure 10. Map of monitoring sites in the St. Lucie Estuary.

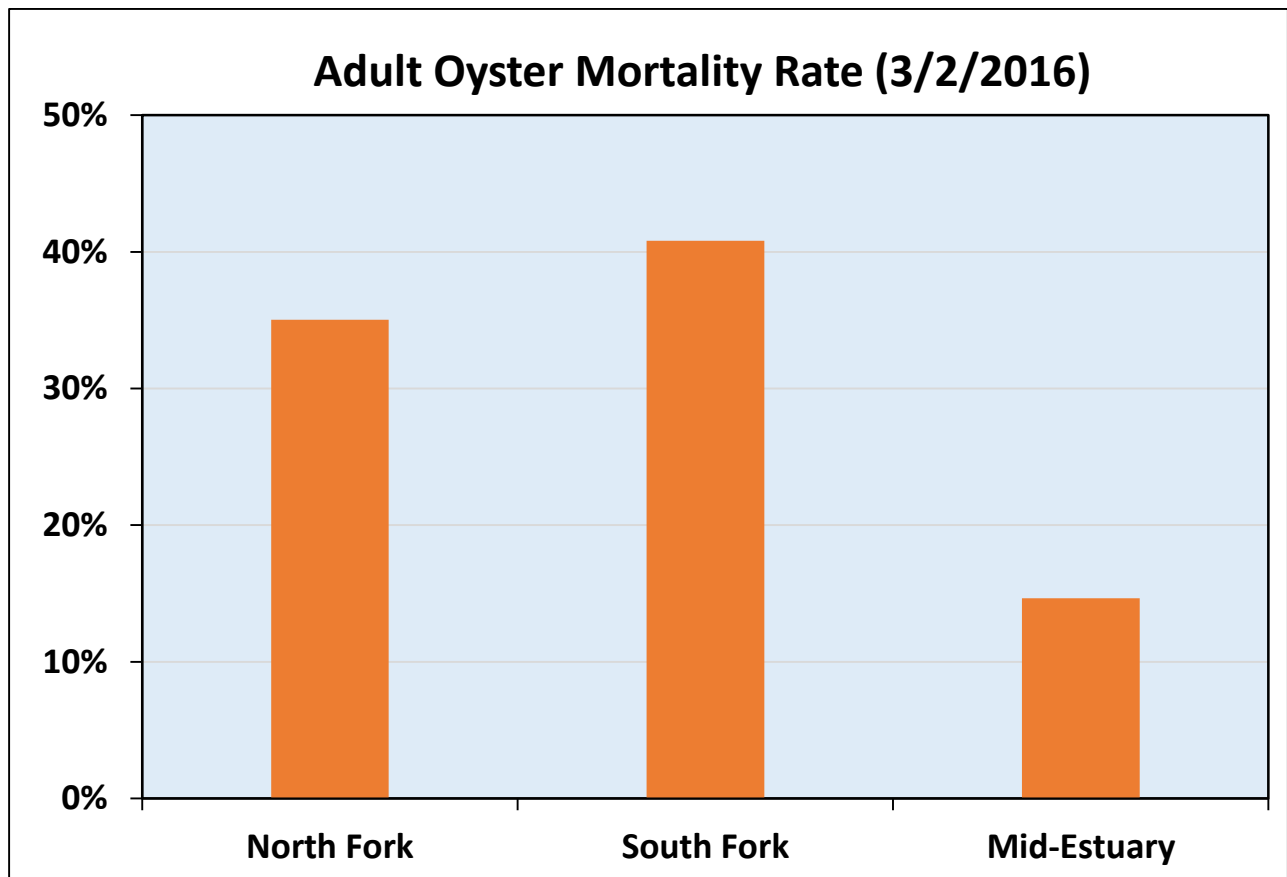
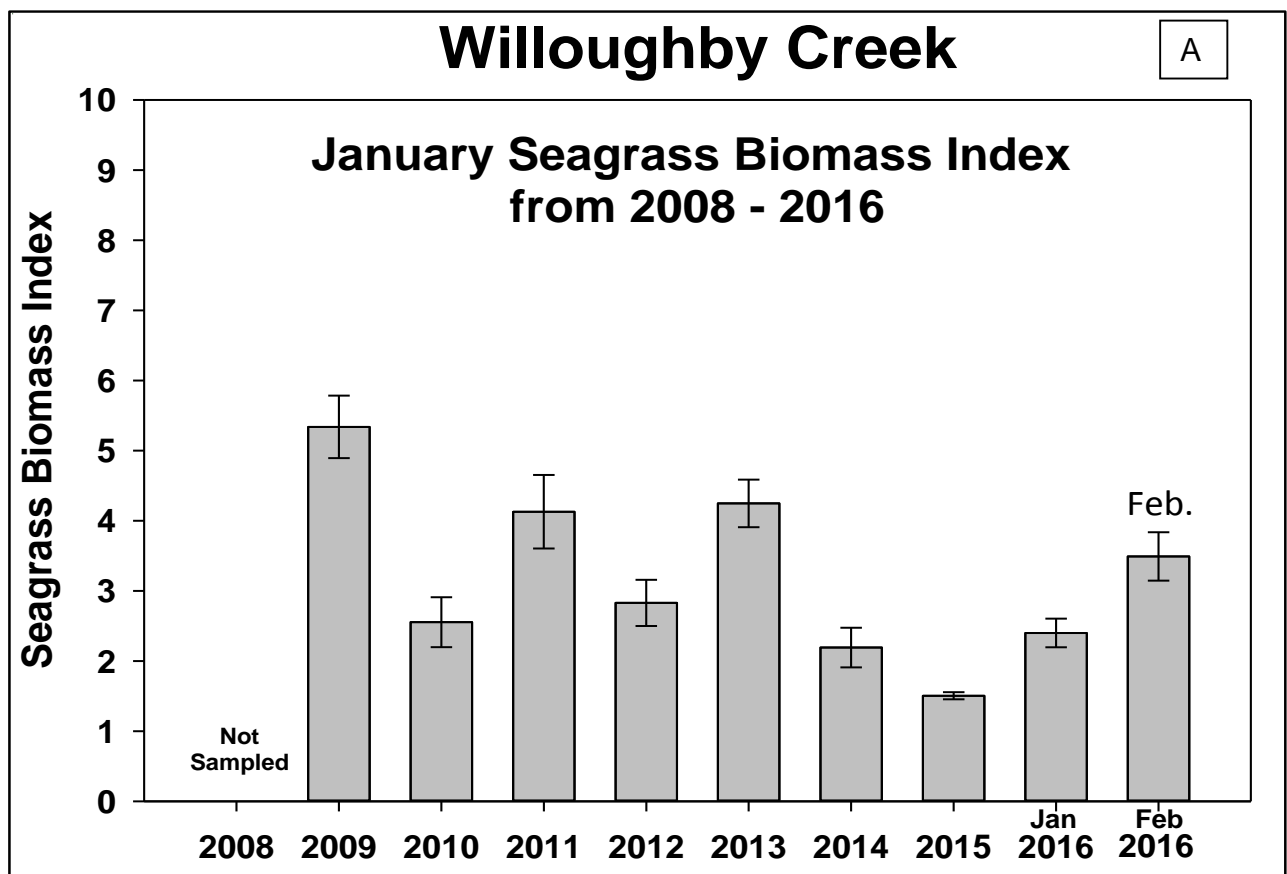


Figure 11. Adult Oyster Mortality Rate in the St. Lucie Estuary.



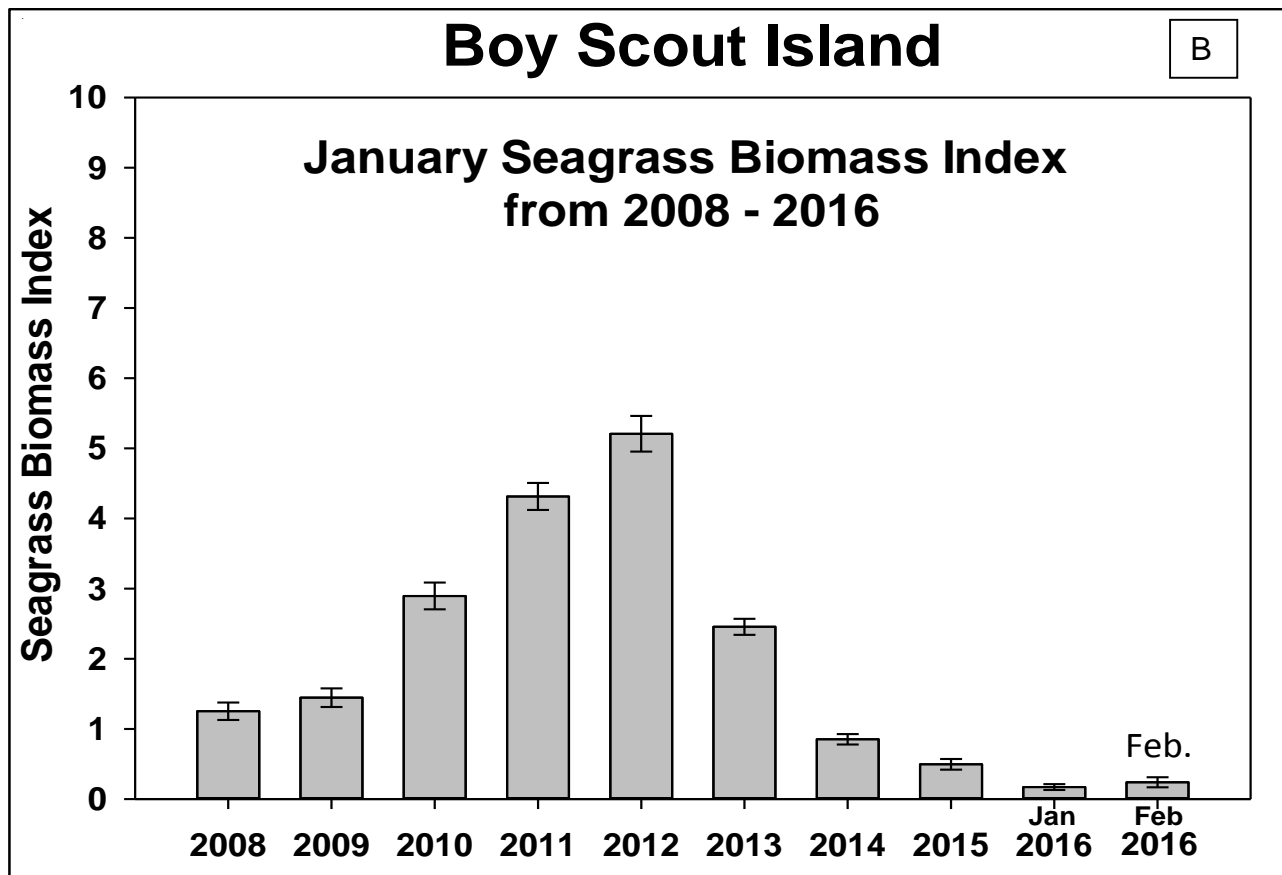


Figure 12. January Seagrass Biomass Index in the outer St. Lucie Estuary at (A) Willoughby Creek and in the Indian River Lagoon just north of St. Lucie Inlet at (B) Boy Scout Island

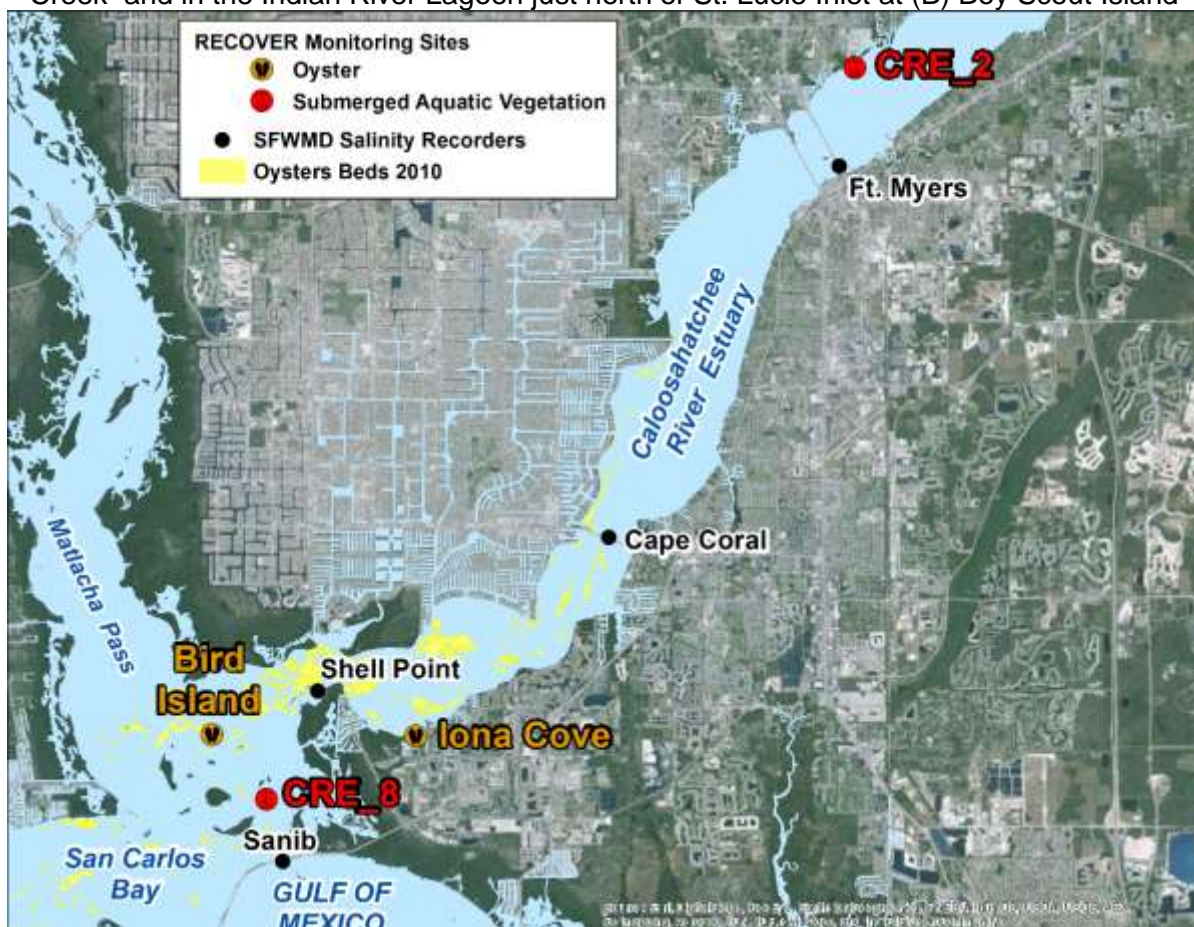


Figure 13. Map of monitoring sites in the Caloosahatchee Estuary.

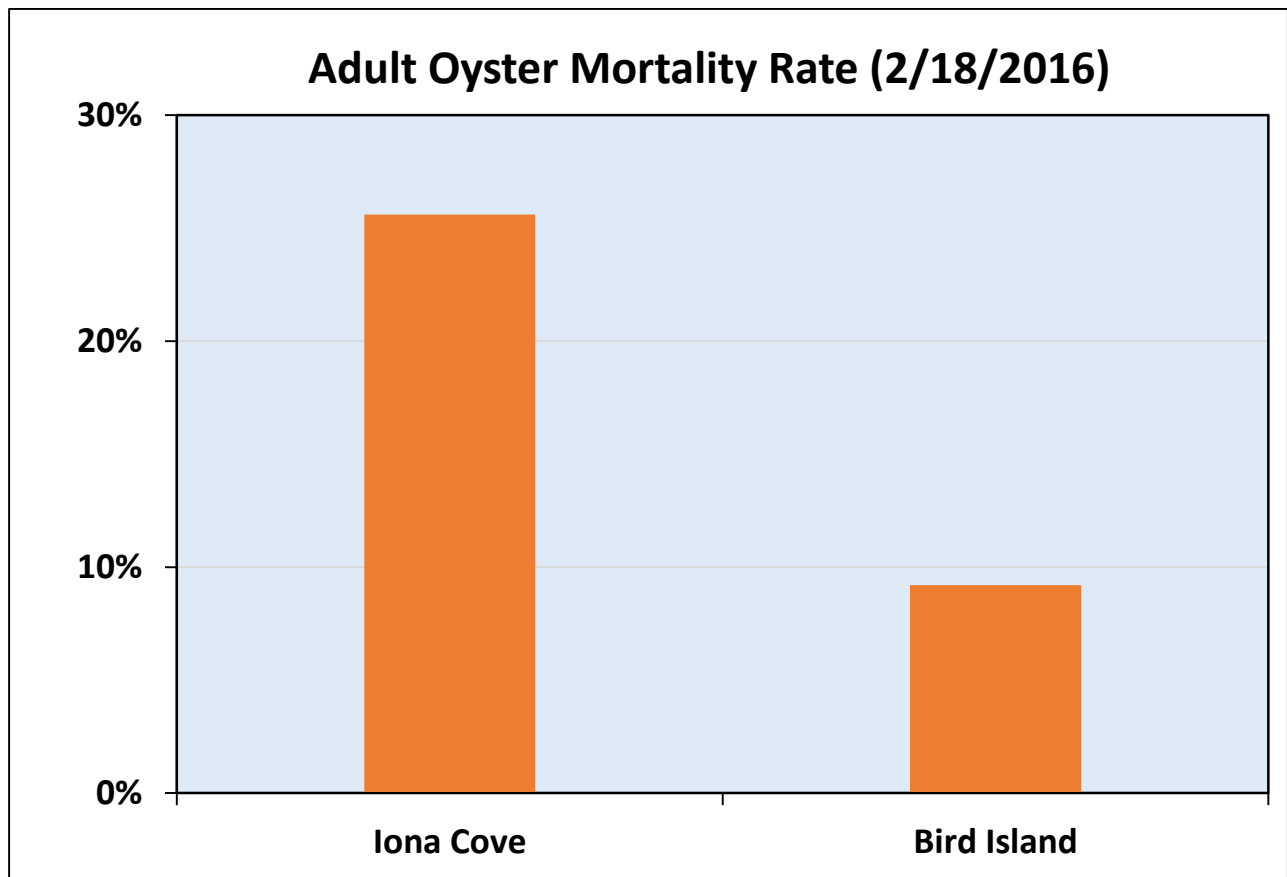
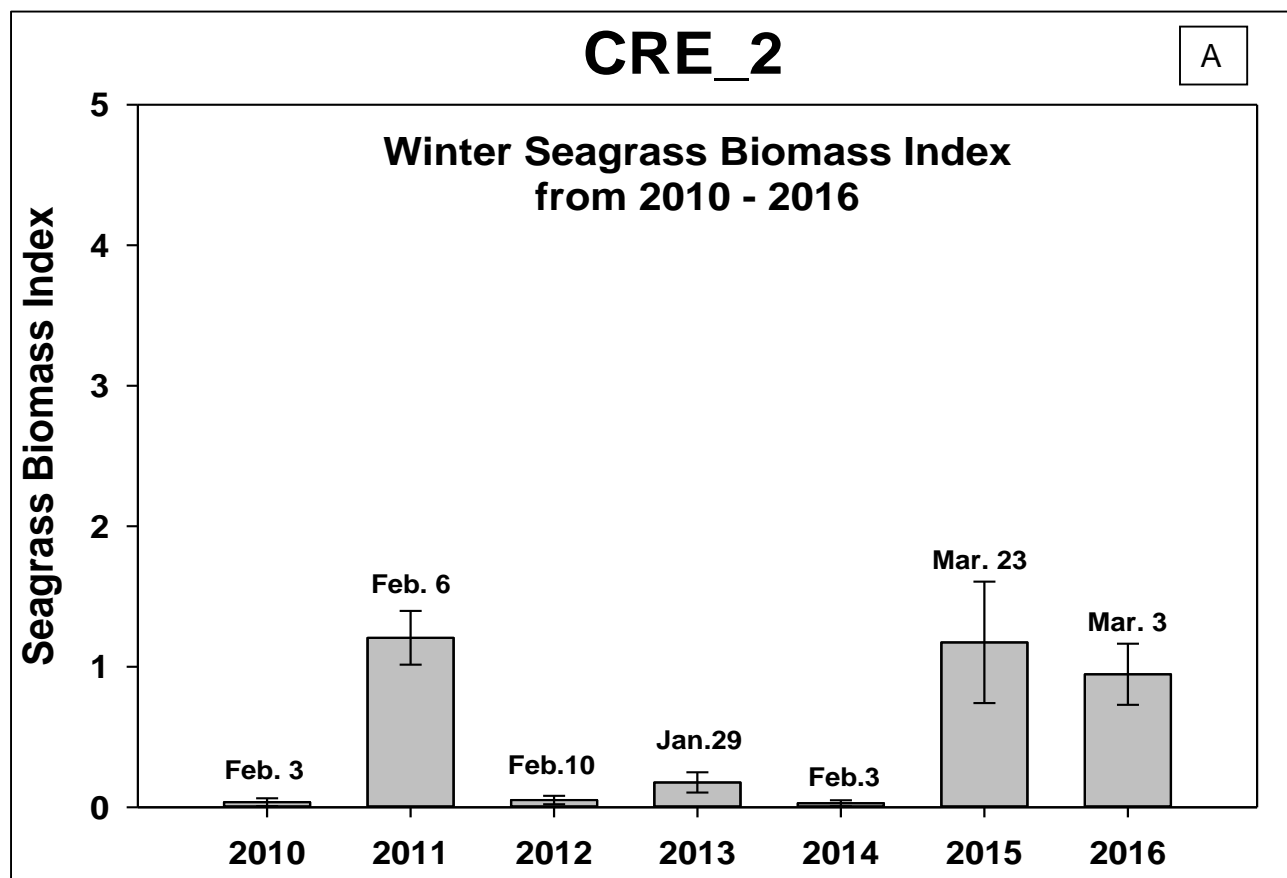


Figure 14. Adult Oyster Mortality Rate in the Caloosahatchee Estuary.



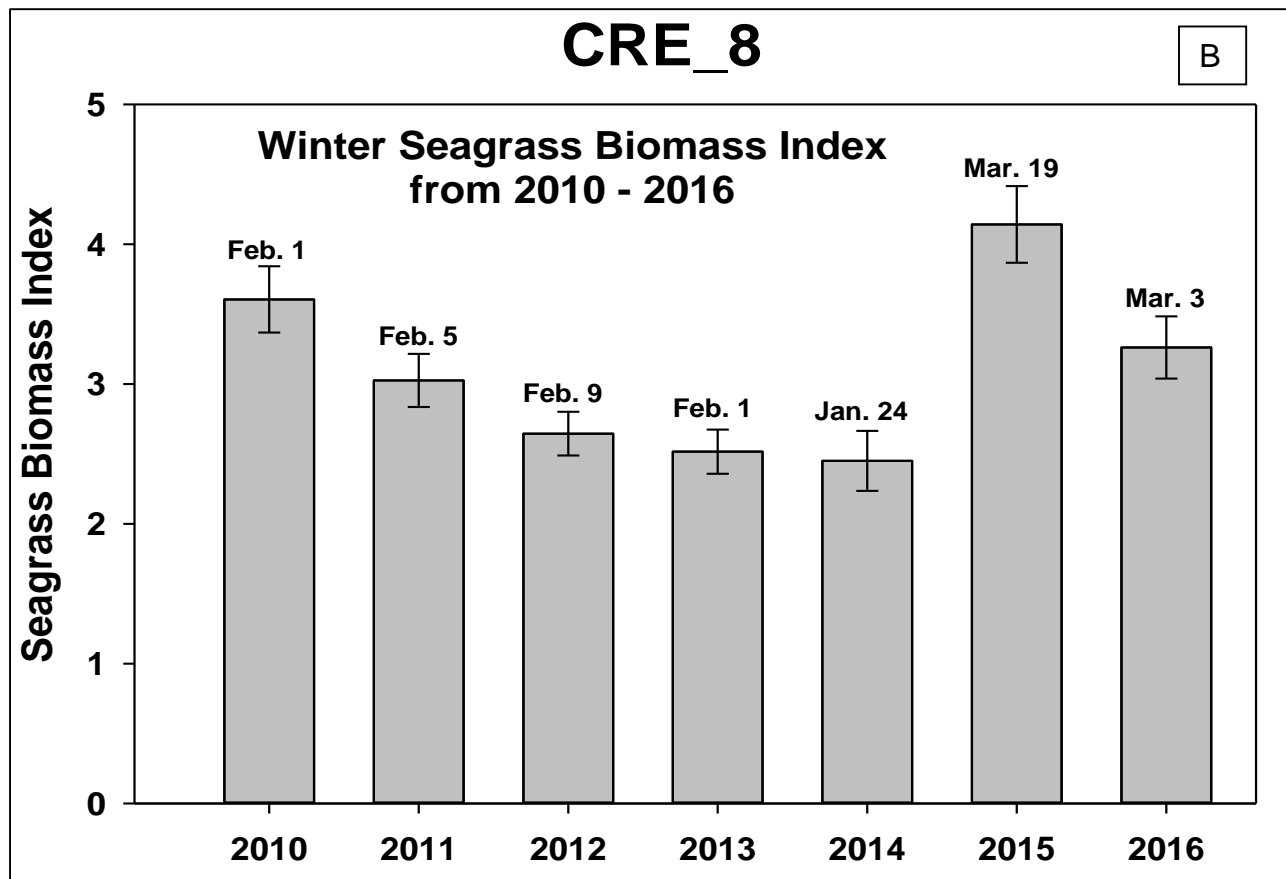


Figure 15. Winter Seagrass Biomass Index (A) Willoughby Creek and (B) Boy Scout Island

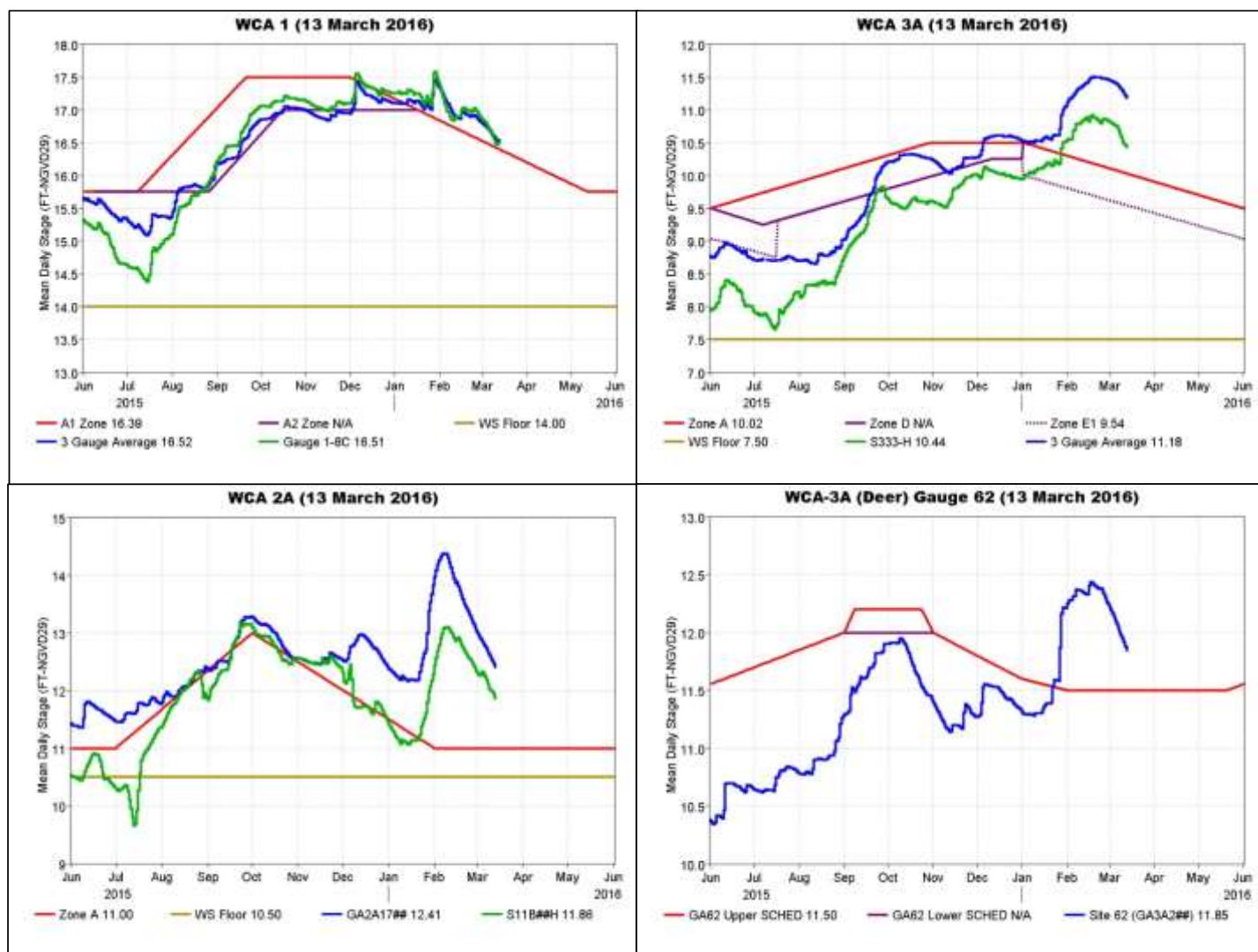
GREATER EVERGLADES

Rainfall was low again last week in the Everglades with a local maximum of 0.91 inches falling in WCA-3B. Over the week, stages declined in the WCAs -0.36 feet to -0.06 feet but increased in northeastern Everglades National Park (ENP) by 0.04 feet. Good recession rates occurred only in WCAs -2B and -3B. At 1.54 inches, pan evaporation was 19 percent above the pre-project average of 1.29 inches.

Everglades Region	Rainfall (Inches)	Stage Change (feet)	
WCA-1	0.09	-0.16	<div style="display: inline-block; width: 15px; height: 15px; background-color: #90EE90; border: 1px solid black; margin-bottom: 5px;"></div> Good <div style="display: inline-block; width: 15px; height: 15px; background-color: #FFFF00; border: 1px solid black; margin-bottom: 5px;"></div> Fair <div style="display: inline-block; width: 15px; height: 15px; background-color: #FF6347; border: 1px solid black;"></div> Poor
WCA-2A	0.01	-0.36	
WCA-2B	<0.01	-0.11	
WCA-3A	0.04	-0.22	
WCA-3B	0.05	-0.06	
ENP	0.01	0.04	

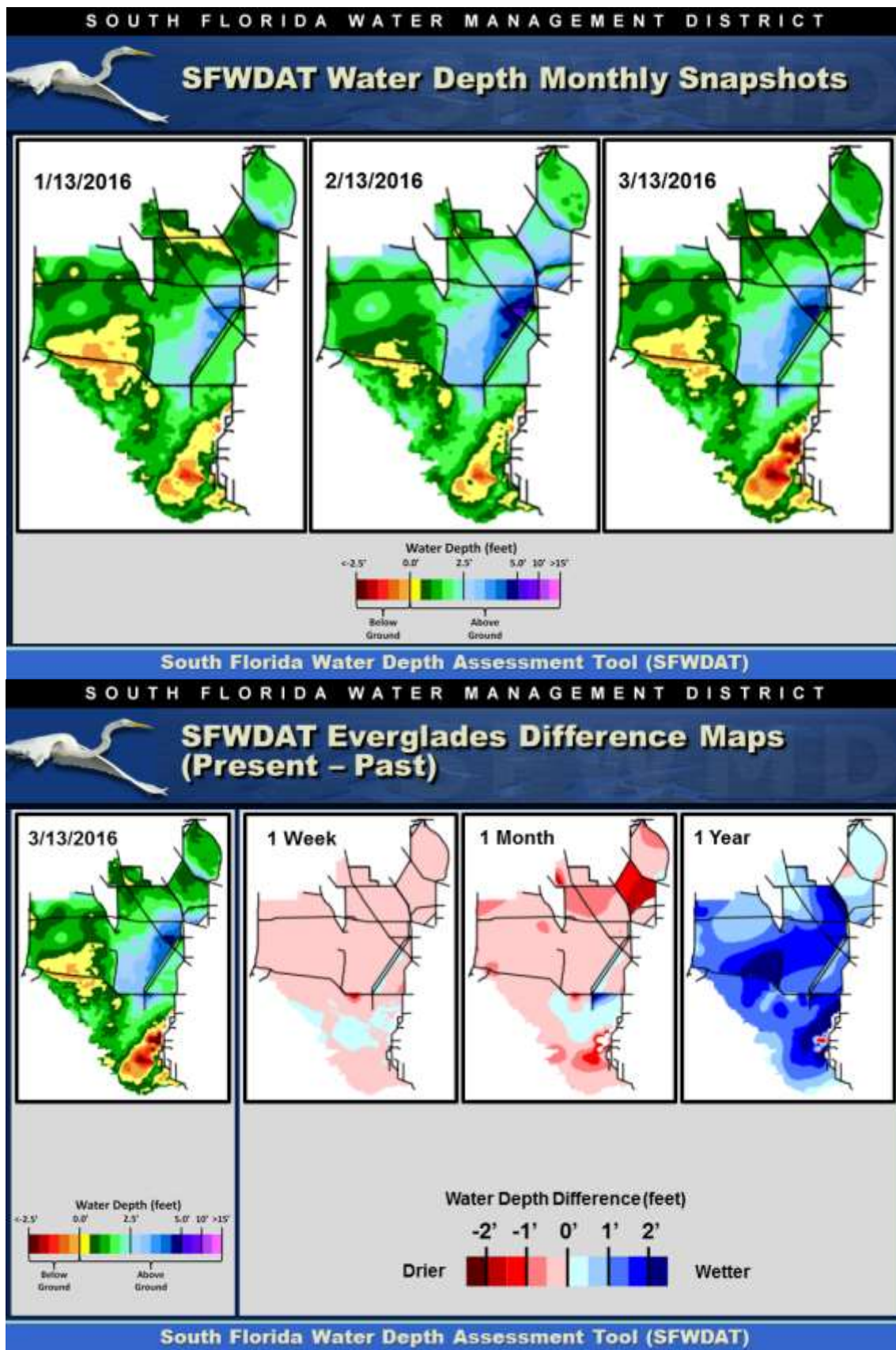
Regulation Schedules: Stages continued to decrease rapidly in the WCAs this week but most remain well above regulation. The WCA-1 stage decreased to only 0.13 feet above regulation, the WCA-2A

stage is 1.41 feet above regulation, and the three-gauge average stage in WCA-3A is 1.16 feet above regulation. The northwestern WCA-3A gauge stage (gauge 62) has decreased to 0.35 feet above regulation.



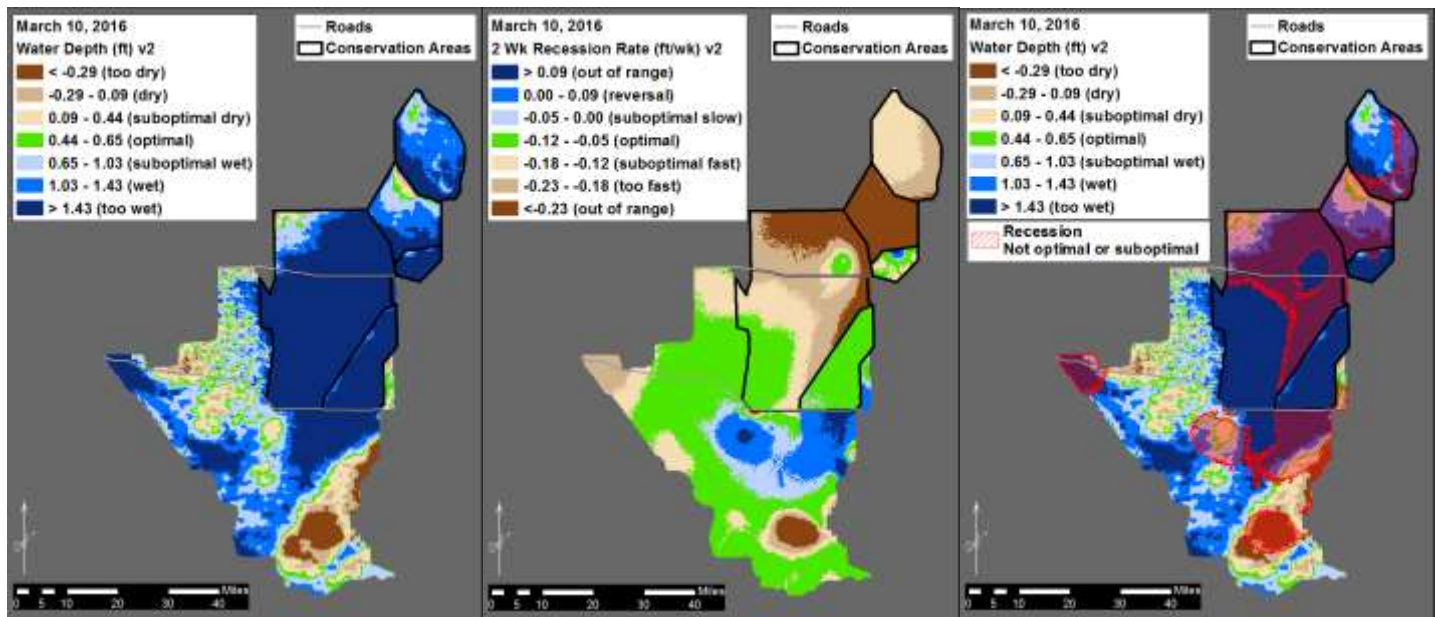
Water Depths and Changes: Water levels have decreased since February and are generally higher than those in January except in WCA-1. Water depths at the monitored gauges (except WCA-2B) range from 1.24 feet to 3.37 feet. Water depth at gauge 65 in southern WCA-3A has exceeded 2.5 feet, the depth of note for tree island inundation-duration, for 16 weeks (it is now 3.37 feet). At gauge 63, the depth has dropped below 2.5 feet but at gauge 64, water depth has exceeded 2.5 feet for seven weeks.

Stages are lower than a week ago in most areas. Stages at individual gauges decreased -0.36 feet to -0.02 feet in the WCAs and increased 0.04 feet in northern Shark Slough last week. Over the last month, stages have dropped by 0.5 feet to 2.0 feet in the WCAs and have increased in western WCA-3B and in ENP. Relative to a year ago, stages are over two feet higher in northeastern WCA-3A and eastern ENP and up to two feet higher elsewhere.



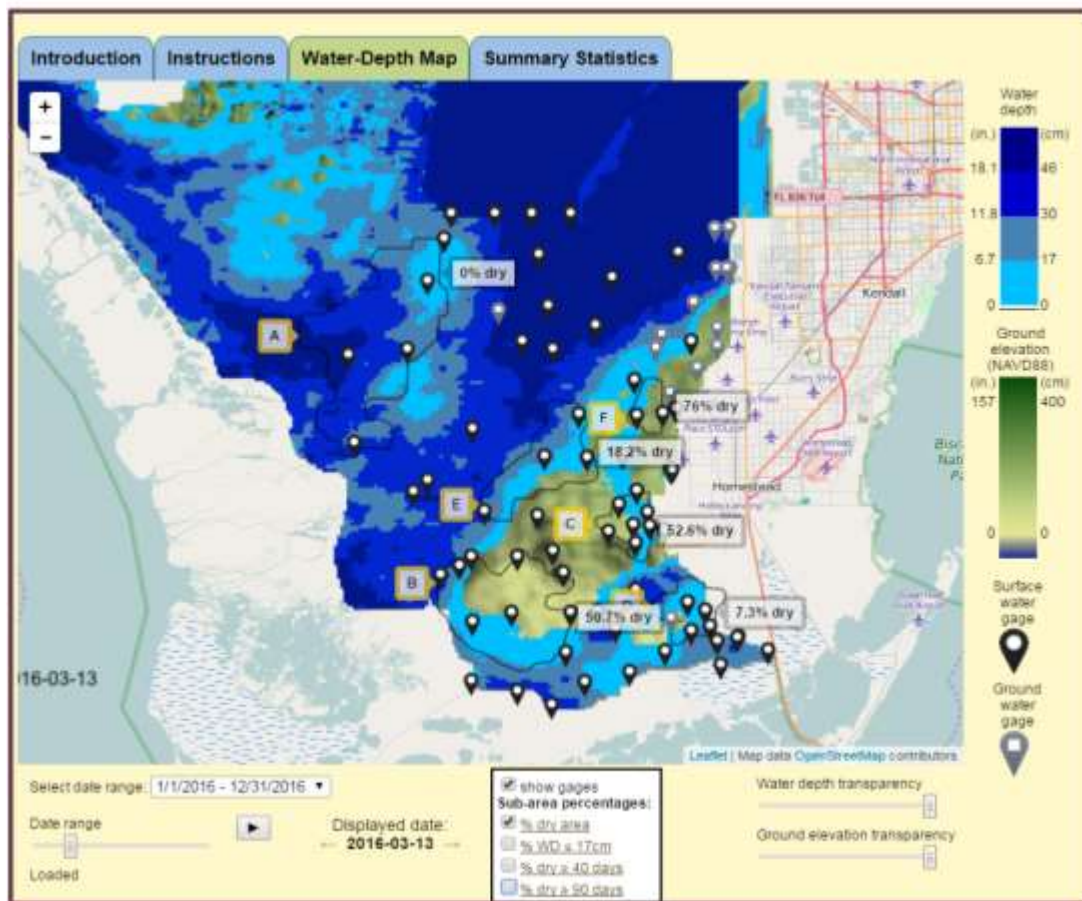
Wading birds and wildlife: Poor conditions continue for nesting in WCAs; foraging may be possible in northern WCA-1. No new information exists for snail kites or wood storks. A biologist from the Florida Fish and Wildlife Conservation Commission reports that conditions are improving for terrestrial wildlife, and their numbers on high ground are decreasing.

Water levels are deep throughout most of the WCAs and recession rates are good in only some of the deep areas. As a result, few areas provide the combination of both depths and recession rates needed by most species. Foraging may be possible in northern WCA-1.

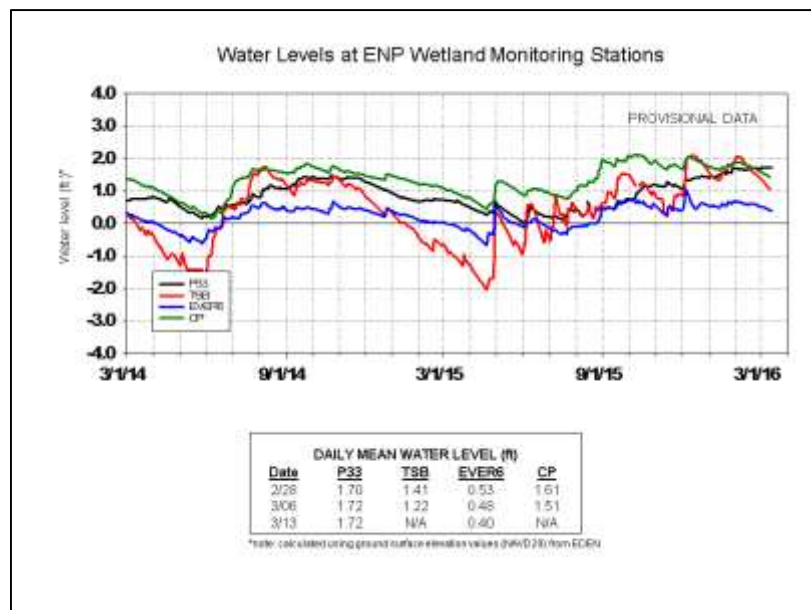


Cape Sable Seaside Sparrow: All subpopulation areas are dryer than last week, with areas of F, C, and B containing the highest percentage of area with water levels below ground. Since conditions are poor for early season breeding, improved conditions later in the season (May-June) may provide late season breeding opportunities.

Cape Sable Seaside Sparrow (CSSS) Viewer

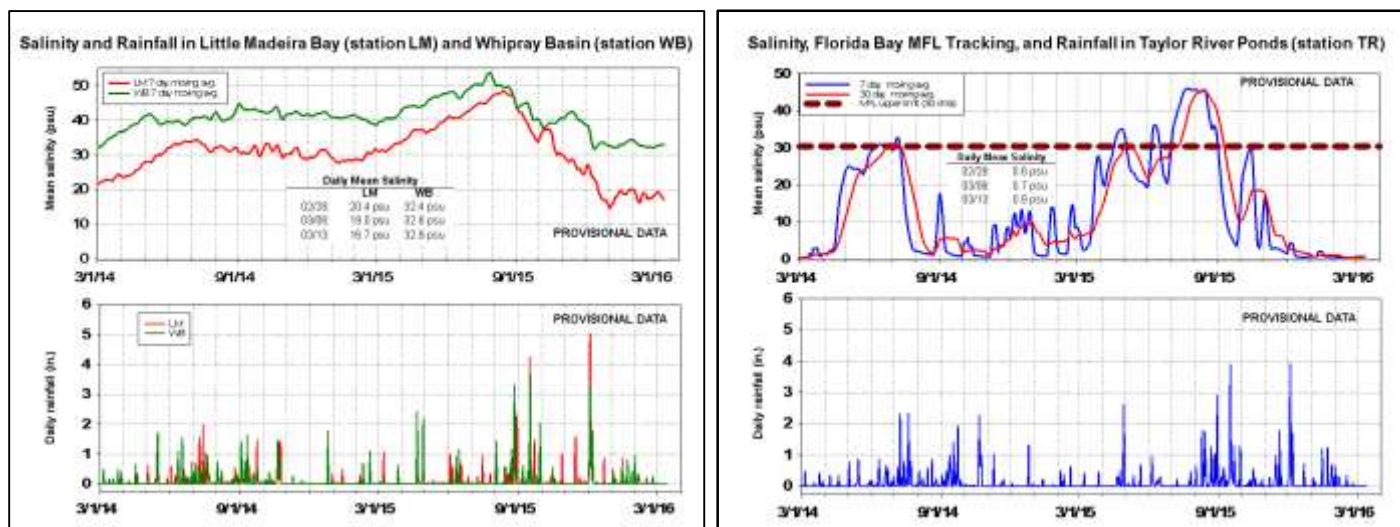


Everglades National Park (ENP) and Florida Bay: Water levels decreased last week in Taylor Slough and increased in northwestern Shark River Slough. Water level data in Taylor Slough were unavailable over the weekend. As of Friday, water levels were still five to 16 inches above average with the higher divergence in the northern parts of Taylor Slough. Northwestern Shark River Slough (P33) is still a foot above average.



Salinities in most of Florida Bay rose last week. The largest change of 9.8 psu occurred in the western nearshore embayments, and the second highest weekly increase (5.9 psu) occurred in the central nearshore embayments. In both the central and western nearshore areas, salinities increased from -11 psu below average to within two psu of their long-term averages. Salinities in the bay remain from 16 to 35 psu, which represent concentrations ranging from within 2 psu of average to -6.4 psu below average in the northeastern Florida Bay embayments (Little Madeira Bay). The 30-day moving average salinity at TR rose to 0.6 psu, below the average of 4 psu typical for this time of year.

The 365-day running sum of the cumulative flow from the five creeks feeding Florida Bay rose slightly to 254,660 acre-feet this week. The weekly (March 7-13) cumulative flow from these creeks was only 16 acre-feet, fairly typical for this time of year when weekly cumulative flow is often negative. This week's flow is much lower than the previous week's total (5,965 acre-feet, about 4,800 acre-feet above average). Creek flow is provisional data from the USGS and is highly variable.



Water Management Recommendations

- Most of WCAs 3A and 2A remain closed. Until the average stage of gauges 62 and 63 falls below 11.60 feet (currently 11.66 feet), no additional discharges into these WCAs should be made.
- Water levels at gauge 65 have exceeded 2.5 feet, the depth monitored for tree island inundation and duration, for 16 weeks (now 3.63 feet deep). The depth at gauge 63 has dropped below 2.5 feet, and the depth at gauge 64 has exceeded 2.5 feet for seven weeks.
- Conditions are too wet, too deep, and too variable for wading birds. As conditions improve, recession rates through the end of May should be managed to support foraging.
- Additional water should not be released into WCA-3A, where most of the remaining tree islands are located, because of harm to tree islands, terrestrial wildlife, and wading bird foraging and nesting.

Recommendations appear in the summary table below. The red text represents new or modified information or recommendations.

Everglades Ecological Recommendations, March 15, 2016 (red is new)

Area	Current Condition	Cause(s)	Recommendation	Reasons
WCA-1	Stages changed - 0.12' to -0.20'	Rainfall, ET, management	Match inflows with outflows to achieve regulation schedule recession while allowing water levels to reflect variation in annual rainfall. Prevent repeated or ongoing reversals as much as possible.	Provide moderate recession rates to support wading bird foraging, necessary for successful nesting.
WCA-2A	Stage changed - 0.36'	Rainfall, ET, management	Lower stages. Prevent repeated or ongoing reversals as much as possible.	Provide moderately fast recession rates to provide suitable depths for avian foraging and nesting.
WCA-2B	Stages changed - 0.10' to -0.12'	Rainfall, ET, management	Follow normal seasonal practices.	High stages generally preclude wading bird use, but can provide good habitat for wading bird foraging as stages decline at the end of the dry season.
WCA-3A NE	Stage changed - 0.18'	Rainfall, ET, management	WCA-2A and northern WCA-3A inflow are not recommended at this time because of high water and ecological concerns. Lower stages throughout the WCAs would be ecologically beneficial.	Provide moderately fast recession rates to provide suitable depths for avian foraging and nesting. Northern WCA-3A and WCA-2A have been closed to the public because of high water effects on wildlife. Additional inputs into these areas are not recommended until stages decline below 11.60' average of gauges 62 and 63.
WCA-3A NW	Stage changed - 0.23'	Rainfall, ET, management		
Central WCA-3A S	Stage changed - 0.22'	Rainfall, ET, management	Prevent repeated or ongoing reversals. Lower the stages. Stages at gauge 65 have exceeded 2.5' since Nov. 23 (16 weeks, now 3.37'), gauge 63 depth has fallen below 2.5', and gauge 64 has now exceeded 2.5' for 7 weeks.	Provide moderately fast recession rates to provide suitable depths for avian foraging and nesting.
Southern WCA-3A S	Stage changed - 0.26'	Rainfall, ET, management		
WCA-3B	Stages changed - 0.02' to -0.11'	Rainfall, ET, management	Follow normal seasonal practices. Prevent repeated or ongoing reversals as much as possible.	Provide moderately fast recession rates to provide suitable depths for avian foraging and nesting.
ENP-SRS	Stage changed 0.04'	ET, rainfall, topography, management	Make discharges to the Park according to the ERTF rainfall plan.	Keep peat wet to promote native habitat and maintain wetland plant and animal communities.
ENP-CSSS habitats	S-12A and S-12B are closed to enhance dry-down.	Rainfall, ET, management	Follow rainfall plan for releases. Adhere to ERTF closures for S12-A and B. Maximizing flows through S333, as possible, is recommended. Follow guidance in C-111 western spreader canal project operations manual.	Provide appropriate hydrological and habitat conditions for CSSS.
Taylor Slough	5-16 inches above average	Rain, ET, inflows	Move water southward as needed	Provide freshwater buffer for ecosystems and maintain low salinity conditions downstream
FB- Salinity	Average to -6 psu below average	Rain, ET, inflows, wind	Move water southward as needed	Maintain lower salinity levels.